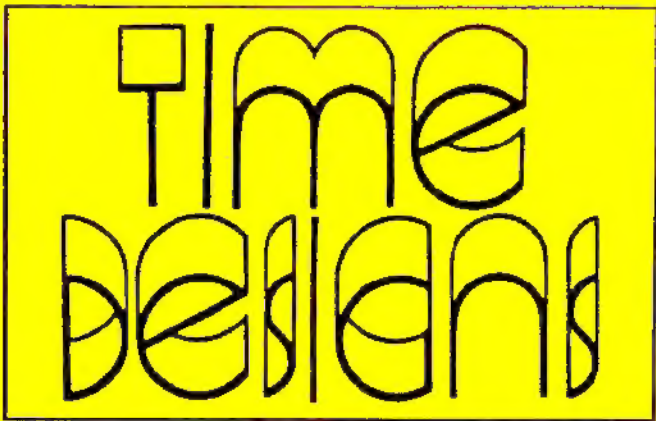


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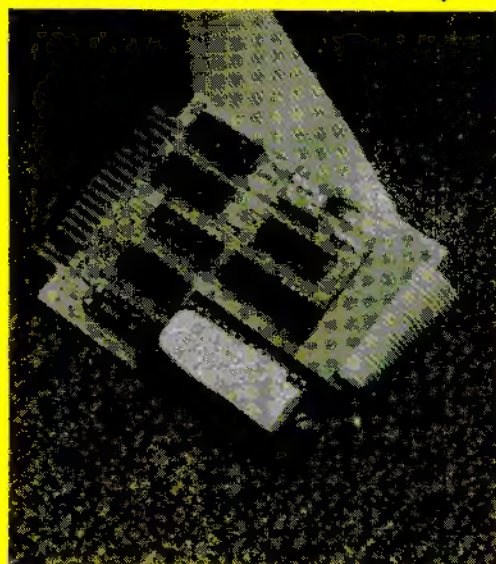
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The SINCLAIR  
Computer Technology  
Magazine

**JULY/AUGUST '88**

Time Designs Magazine Company  
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### Sinclair Survivalist HANDBOOK

The Sinclair Survivalist Handbook is a new 70 page book that is filled with previously un-published program listings and articles, written by regular contributor's to TIME DESIGNS, for the TS1000/ZX81, TS1500, TS2068, and the Sinclair QL. Examples include: "Adapting external keyboards to your TS1000", "BASIC Line Delete Utility", "Strategic Football", "Fix Your TS2068 Space Bar", "OS-64 Utilities", "Little League Scheduler", "Homemade ROM-Switch", "Draw Poker", "QL Super-BASIC Tutorial", "Using Quill With The QL Printer", "Inside the QL", and much more! If you like TIME DESIGNS...you'll like this new book. Order your copy today!

**9.95**



# READER SURVEY RESULTS

## Part One

Over 280 TIME DESIGNS readers responded to our recent survey. Which is approximately 11 percent of our circulation. Some of the results were most interesting. The rest of the results will conclude next issue. We sincerely hope that this data will provide developers of hardware and software, and the Timex Sinclair dealers with a better understanding of our TS user community.

Average Age of TDM Subscriber: 45

Oldest Reported Age: 79

Youngest Reported Age: 22

Male/Female Ratio: 22 Male/1 Female

States of Highest TS User Concentration:

California

New York

Pennsylvania

Florida

Texas

Ohio

Illinois

Virginia

Michigan

Other Computer Owned:

1. TS1000

2. TS2068

3. ZX80

4. TS1500

5. QL

Most Popular Printer:

1. 2040 Thermal Printer

2. Gorilla Banana

3. Epson RX-80

4. Star NX-10

5. Panasonic KXP-1080

Most Popular Mass Storage Device Used:

1. Cassette Tape

2. Floppy Disk

3. Microdrive Cartridges/Wafers

4. EPROMs

10 Most Common Occupations of TS Users:

1. Retired

2. Engineer

3. Electronic Technician

4. Supervisory/Management

5. Student

6. Instructor

7. Consultant

8. Military

9. Sales

10. Librarian

Most Popular TS2068 Disk Systems:

1. Aerco FD-68

2. Larken LKDOS

3. Zebra FDD

4. Oliger SAFE DOS

5. Ramex MK

Top 5 Hobbies of TS Users:

1. Computers

2. Electronics

3. Photography

4. Amateur Astronomy

5. Gardening

5 Most Popular Monitor Devices:

1. Color and B/W TV

2. Magnavox RGB

3. Zenith

4. Sanyo

5. Commodore

Computer Used The Most:

1. TS2068

2. TS1000

3. QL

4. IBM (or compatible)

5. Commodore 64

# TIMEX SINCLAIR NEWS



FINALLY...  
FULL COLOR  
screen dumps  
for the 2068!!

If only TIME DESIGNS were printed in color! Then we could show you what the actual "Sir Clive" screen dump (above) really looks like. It was produced using a program called THE ARTIST, a TS2068 computer, an OKIMATE 20 Color Printer, and a special interface and printing utility software.

To back-track just a bit...a couple of years ago, a puzzled TDM subscriber sent a letter to the editor, and posed the question whether the OKIMATE 20 could be used with the 2068. Seems that the Okimate was configured to operate with "most popular brands" of personal computers, with optional "Plug 'n Print" interface/software packages...all of the brands, except the Timex (of course).

Thanks to the research and development of John McMichael (who also adapted an inexpensive Commodore plotter to the 2068), Timex users no longer have to face discrimination. Using the Okimate 20, the Commodore "Plug 'N Print" package, and John's new "Commodore serial port emulation circuit board", high quality screen dumps can now be enjoyed in color. John also offers several print utility programs to help get the job done.

Not only is the Okimate 20 a good color printer, but it is also suited for normal printer use (including NLQ mode).

Information about the interface, and related 2068 software can be obtained by sending a legal SASE to: John McMichael, 1710 Palmer Drive, Laramie, WY 82070.

The Okimate 20 must be purchased elsewhere, and is available everywhere. Try Sears, Target, Best, or Lyco Computer Inc. (1-800-233-8760). Typical discount price for printer and "Plug 'n Print" package is right around \$180.

## MIDI FOR THE 2068



Another frequently requested device for the TS2068 is a MIDI Interface. MIDI stands for "Musical Instrument Digital Interface". Which is the means for hooking up electronic synthesizer keyboards, drum boxes (and much more) to your computer. Other computer brands like the ATARI ST and IBM PC are very strong in the area of MIDI support, both hardware and software.

MIDI is an invaluable tool for music students, composers, and live performers. And since MIDI is a word-wide industrial standard among electronic music instrument manufacturers and computer manufacturers, it wouldn't matter if you had an ATARI or a SINCLAIR, the hardware compatibility should be the same.

Recently, Richard Hurd, a TDM subscriber and occasional contributor wrote, "I have had success implementing MIDI on my TS2068. I also would be happy to hear from anyone interested in this."

Richard has purchased RAM Electronic's MUSIC MACHINE, a MIDI interface for the Spectrum, from England (see review in the November '86 issue of ZX Computing), and also some accompanying MIDI software from a company called QUASAR. To operate the Spectrum hardware and software on the TS2068, Richard purchased John Mathewson's "Twister Board" for the rear expansion bus, and also used a Spectrum emulator.

For further details, addresses, and even tips on ordering from Great Britain, send a SASE to: Richard Hurd, PO Box 153, Warrenton, OR 97146.

## WHERE GOEST FRED??

Fred Nachbaur, formally of Nelson, British Columbia, Canada, and highly-respected authority on Sinclair computers, has taken several new turns. Most recently, he has accepted a position with a firm in Ottawa, and will be turning his TS1000/ZX81 product line over to other Timex Sinclair dealers.

Fred's own company, Silicon Mountain Computers, will be renamed "Silicon Mountain Electronics", which, as the name implies, will pursue avenues of a more general electronic nature as well as computers.

As a former TS software/hardware producer and supplier, Fred found that he lacked critical time and funding for development of various special projects, including one particular project...a new type of computer.

Fred recently told TIME DESIGNS that, "It should be clearly understood, however, that this project is by no means a certainty at this point. It's not because of the infamous "big IF", rather it depends on a whole lot of "little if's". I have carefully chosen a core of potential developers who have expressed an interest to investigate the potentials; IF we all agree on the route to take; IF we all find the time to do our parts; IF the economics fall into place; IF the result of our brain-pooling results in a marketable product; IF no one comes up with a better mouse before we build a better trap...then there will be a new computer. But don't believe anything you hear, unless you hear it from us. If it does happen, it will not be, as rumour has it, a Timex "clone". The new machine will have some common features, such as elegance in simplicity, but a new machine in its own right."

Fred wants everyone to know that he will continue to be involved with the ZX81 family of fine computers; as a user, writer, and hacker, but not as a commercial supplier of TS software.

## SECRET STUFF

Nigel Searle, a close associate of Sir Clive Sinclair for over sixteen years, announced to the General Assembly of the Boston Computer Society, on

June 22, that Sir Clive was involved in developing some highly secretive computer equipment, and that he (Sir Clive) would personally announce detailed plans of the project and launch it world-wide at an upcoming BCS meeting.

The only speculation and possible clues about the new computer equipment are coming out of the British press. Supposedly, Sir Clive is developing a new desktop computer based on transputer chip technology, similar to the INMOS transputer, only Sir Clive felt that the INMOS was unsuitable for his project, and went out and developed his own transputer. The new desktop will reportedly outperform any PC technology currently available, processing data more than 10 times faster than an IBM AT. The new machine will be marketed under the CAMBRIDGE COMPUTER LTD label, just as the Z88 Laptop is.

## CLEVELAND

Saturday, August 27 and Sunday, August 28, marks the date for the upcoming MIDWEST SINCLAIR COMPUTER CONFERENCE, which will be held at the Beck Center in Lakewood, Ohio (a suburb of Cleveland).

The Conference will feature TS exhibitors like Zebra Systems Inc., Sharp's Inc., Time Designs, and others; as well as seminars by Bill Ferrebes, James DuPuy, Basil Wentworth, Dave Hoshor, Thomas Simon, and others.

For complete details, info on accommodations available in the area, pre-registration forms, and more, send a SASE to: Andy Kosiorek, 2192 Glenbury Ave., Lakewood, OH 44107. For alternate information contact: James DuPuy, 6514 Bradley Ave (down), Parma, OH 44129, (216) 661-4105.

If you live in Ohio, any of the surrounding states, the midwest proper, Ontario (Canada), most anywhere on the eastcoast and southern states (or anywhere!)...come to the show and exchange ideas and information with fellow Timex Sinclair users.

## NEW RELEASES

PODNUH is a clever name for a new TS2068 program, which has been thoroughly tested since its conception in 1986. This Machine Code program includes a BASIC programmer (called "Supra-Basic") with a swift and reliable method of passing parameters to, and calling other Machine Code programs. These "other" programs may be customized routines, extensions of BASIC, utility programs, or complete applications programs. A PODNUH (version 1) package is available for \$17.00 + \$2.00 postage, which includes selectable type fonts, a perpetual calendar, note pad, scientific calculator, and more. "Add-On" options will continue to be added, such as WYNN DOE (a windowing utility) for \$5.00. The author is also interested in sharing his program with programmers or user groups, and is offering a disassembled listing with documentation for \$1.00, with the hope that PODNUH is adopted as a new 2068 standard. Send check or money order to: Ron Ruegy, 37529 Perkins Road, Prairieville, LA 70769.

Many Timex fans have heard or read about the research that William J. Pederson of THE WIDJUP CO. has conducted on the TS2068 ROM/Operating System, from articles in several user group newsletters and magazines. Now there is a 160 page book by Mr. Pederson called "TOURING THE TS2068 ROM OPERATING SYSTEM". While this type of book isn't for everyone, it will be of interest to programmers and 2068

hacker-types everywhere. It contains a complete annotated disassembly of the Home ROM and the XROM, along with several other tables of data. Mr. Pederson offers a theory which one may or might not accept about the development of the Timex ROM and bank-switching routines...but it all makes for interesting reading. The book is priced at \$20.00 + \$3.00 postage and is available from: The WIDJUP Co., 1120 Merrifield S.E., Grand Rapids, MI 49507.

Arnold Ramaker, PO Box 263, Plymouth, WI 53073, (414) 893-8865, is busy designing an expansion box for the ZX81, TS1000, TS1500, TS2068, and Sinclair QL computers. Any one of the computers can be placed inside the supplied case. The expansion box will feature multi-expansion slots and provisions for attaching a monitor, and several other peripherals. Mr. Ramaker would like to hear from folks who are interested in purchasing an expansion box like this, to get an idea on what price range and any additional features people would like to see incorporated.

Matthew Zenkar, 142 Holcroft Rd., Rochester, NY 14612, (716) 663-2048, is offering a utility program which will allow QL owners who use the Digital Precision Desktop Publisher software package, to dump their files to Hewlett Packard-compatible laser printers. Write for information and price.

The S.A.I.N. (Sinclair Artificial Intelligence Network) special interest group is now forming. It is for any Sinclair user interested in A.I., MICRO-PROLOG, LISP, and other related topics. For further information, send a SASE to: Pete Fischer, PO Box 2002, Tempe, AZ 85281, or call the TIMEWARP BBS, (617) 481-0555 (setting: 8/1/N. 300 baud).

### LARKEN PRESENTS ...

#### UP TO 256K RAM for your 2068

- Expand your 2068 with up to 256K of battery backed up Ram
- Larken Operating system lets you SAVE to memory, just like cassette or disk (Floppy disk not required)
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- \*\* PRICE - MEMORY SYSTEM with 64K Ram ..... \$129.00
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- The most advanced Dos available for the 2068/Spectrum. LKdos uses ALL Commands such as CAT MERGE ERASE LOAD SAVE PRINT OPEN etc. Also can support RAMDISK up to 256K and Sequential / Random Access Files (with additional software). The Larken Disk Interface can handle up to 4 floppys for up to 3.2 MegaBytes of storage. Also NMI Snapshot Save Button and KEMPSTON Joystick port on interface Also 10 Extended Basic commands for Windows and Graphics.

AERCO RAMEX or OLIGER Disk users can add LKdos for more commands, Randisk and access to all LKdos software

- \*\* PRICE - Larken Floppy Disk System ..... \$119.95
- Floppy Disk IF with 0 K Memory board .. \$169.95
- Larken Disk Editor ..... \$ 15.00
- Sequential/Random access files ..... \$ 15.00
- Xmodem to Disk Modem package ..... \$ 15.00
- ZX-81 Floppy Interface (15 left) ... \$ 99.95
- LKDOS for Aerco, Ramex or Oliger Disk IF \$ 59.95

(All prices are US, Add 6\$ Shipping)

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# "ZX... PHONE HOME!"

## A TS1000/TS1500/ZX81 Program To Help Remember Telephone Numbers

by David Hartman

The following program develops words based on the last four digits of telephone numbers. I have found that a phone number is remembered as a word, easier than the four numbers.

This program will run on a TS1000 or ZX81 with a 16K RAM pack installed, or on a TS1500. This program should also work with a TS2068, with only minimal changes to the program.

Those users with a 16K TS1000/ZX81, should end up with "13505" printed on the screen, after entering the following line: PRINT (PEEK 16388 + 256 \* PEEK 16389) - (PEEK 16396 + 256 \* PEEK 16397)

If "13505" is your answer, then you have most likely typed in the program listing correctly.

### Line Uses:

1-24: Opening screen  
25-40: Instructions and input  
50-70: Check for '1' and '0'  
80: See 8000  
110-200: Assemble words by slicing  
202-255: Print results on screen  
260-310: Copy and continue  
300-375: Assemble words if a '1' or '0' are involved  
600-640: Re-establish phone number for printing  
5010-5040: Initialize, set up arrays  
8000-8040: Not useful message

### VARIABLES:

n\$: Holds entered phone number  
w\$: Holds all possible letter combinations  
l\$: Holds telephone dial information  
f: Flag indicates if a '1' or a '0' is in the number  
(Important to know because 1 and 0 do not have assigned letters)  
x: Increment control  
J, k, l, m: For/Next control

```
1 REM WORDS FROM TELEPHONE NUMBERS
2 REM 105/1.1 3/20/88
3 SLOW
4 CLS
10 PRINT AT 6,0;"WORDS FROM TELEPHONE NUMBERS";AT 14,0;"LETS SEE WHAT YOUR NUM
BER SPELLS"
15 PRINT AT 21,0;"(C) 1988 DAVID HARTMAN"
20 GOSUB 5000
22 FOR J=1 TO 60
24 NEXT J
25 CLS
27 PRINT TAB 8;"TELEPHONE WORDS",,,
30 PRINT "ENTER THE LAST FOUR DIGITS OF YOUR TELEPHONE NUMBER TO SEE","WHAT
THEY SPELL. THEN, USE THAT WORD WHEN SOMEBODY WANTS YOUR","NUMBER. THEY PROBABLY
WILL BE","ABLE TO REMEMBER IT WITHOUT","WRITING IT DOWN."
40 INPUT N$
43 IF LEN N$<4 THEN GOTO 90
45 LET F=0
50 FOR J=1 TO 4
65 IF N$(J)="1" OR N$(J)="0" THEN LET F=F+1
67 IF N$(J)="1" THEN LET N$(J)="Q"
68 IF N$(J)="0" THEN LET N$(J)="Z"
70 NEXT J
80 IF F>1 THEN GOTO 8000
85 GOTO 110
90 PRINT AT 15,0;"YOU DID NOT ENTER A 4 DIGIT",
"NUMBER. PLEASE TRY AGAIN."
95 FOR J=1 TO 60
97 NEXT J
100 GOTO 25
110 LET X=1
115 FAST
120 FOR J=1 TO 3
130 FOR K=1 TO 3
140 FOR L=1 TO 3
150 FOR M=1 TO 3
153 IF F THEN GOTO 500
167 LET W$(X)=L$(VAL N$(1),J)+L$(VAL N$(2),
K)+L$(VAL N$(3),L)+L$(VAL N$(4),M)
169 LET X=X+1
170 NEXT M
180 NEXT L
190 NEXT K
200 NEXT J
202 CLS
203 SLOW
```

```
205 GOSUB 600
210 PRINT "HERE ARE THE CHOICES FOR ";N$;" "
212 PRINT
215 LET J=1
220 FOR K=J TO J+5
225 IF K=82 THEN GOTO 260
230 PRINT W$(K);". ";
240 NEXT K
245 PRINT
250 LET J=K
255 GOTO 220
260 PRINT AT 21,0;"(C) COPY?"
270 INPUT A$
280 IF A$<>"C" THEN GOTO 25
290 PRINT AT 21,0;"
300 COPY
310 RUN
500 IF N$(1)="Z" THEN LET W$(X)="O"+L$(VAL N$
(2),K)+L$(VAL N$(3),L)+L$(VAL N$(4),M)
315 IF N$(1)="Q" THEN LET W$(X)="I"+L$(VAL N$
(2),K)+L$(VAL N$(3),L)+L$(VAL N$(4),M)
520 IF N$(2)="Z" THEN LET W$(X)=L$(VAL N$(1),
J)+"O"+L$(VAL N$(3),L)+L$(VAL N$(4),M)
```





```

530 IF N$(2)="Q" THEN LET W$(X)=L$(VAL N$(1),
    J)+"1"+L$(VAL N$(3),L)+L$(VAL N$(4),M)
540 IF N$(3)="Z" THEN LET W$(X)=L$(VAL N$(1),
    J)+L$(VAL N$(2),K)+"0"+L$(VAL N$(4),M)
550 IF N$(3)="Q" THEN LET W$(X)=L$(VAL N$(1),
    J)+L$(VAL N$(2),K)+"1"+L$(VAL N$(4),M)
560 IF N$(4)="Z" THEN LET W$(X)=L$(VAL N$(1),
    J)+L$(VAL N$(2),K)+L$(VAL N$(3),L) + "0"
570 IF N$(4)="Q" THEN LET W$(X)=L$(VAL N$(1),
    J)+L$(VAL N$(2),K)+L$(VAL N$(3),L) + "1"
575 GOTO 169
580 STOP
600 FOR J=1 TO 4
610 IF N$(J)="Q" THEN LET N$(J)="1"
620 IF N$(J)="Z" THEN LET N$(J)="0"
630 NEXT J
640 RETURN
5010 DIM L$(10,3)
5015 DIM W$(81,4)

```

```

5020 LET L$(1)=" "
5022 LET L$(2)="ABC"
5024 LET L$(3)="DEF"
5026 LET L$(4)="GHI"
5028 LET L$(5)="JKL"
5030 LET L$(6)="MNO"
5032 LET L$(7)="PRS"
5034 LET L$(8)="TUV"
5036 LET L$(9)="WXY"
5038 LET L$(10)=" "
5040 RETURN
8000 CLS
8005 GOSUB 600
8010 PRINT AT 14,0;"YOUR NUMBER, ";N$1", HAS
    TOO MANY ONES OR ZEROS TO BE USEFUL
    IN CREATING A WORD....SORRY ABOUT THAT,"
8020 FOR J=1 TO 100
8030 NEXT J
8040 GOTO 25
8999 STOP
9000 SAVE "TELEWORDS"
9010 RUN

```

# STUD POKER

## A Casino-Style Game Listing For The TS2068

by William C. Andrews

This is a TS 2068 program to play FIVE CARD STUD POKER against the computer, the dealer. After an ante you bet on each card dealt. The dealer matches your bet. You say go out at any time by betting "0". You must pay to see the hole card if needed. The dealer is also the banker and will keep track of the game's progress.

When typing the program please note that letters in quotes in lines 6010, 6030, 6050, 6140, 7020, 9991 and the last letter in lines 8001 to 8052 are in GRAPHIC mode for UDG's. Line 9992 clears color from the screen for working on the program. Line 6000 selects cards randomly and line 6110 prevents duplication. Cards are shuffled for each game.

For a tape of this program send \$ 10.00 pp to me at 30 oak Knoll Drive, San Anselmo, CA. 94960.

```

10 LET ST=100
15 IF ST<=0 THEN GO TO 4670
20 BORDER 4: PAPER 4: CLS : LE
T T=0: GO SUB 8000
25 PAPER 7: FOR N=2 TO 14: PRI
NT AT N,0;" "
    "; NEXT N
30 LET PR=0: LET DR=0: LET PL=
0: LET DL=0: DIM X$(6): DIM Y$(6
)
35 RANDOMIZE
40 PRINT PAPER 4;" "
ER 2: INK 7: BRIGHT 1;AT 0,5;" F
IVE CARD STUD POKER "; BRIGHT 0;
PAPER 4;" "
45 INK 1
50 LET K$=" "
55 LET L$=" "
60 PRINT PAPER 4;K$
65 PRINT "1"; INK 0;" YOUR HA
ND DEALERS HAND "; INK 1;" "
70 PRINT AT 3,0;L$;AT 3,0;" "
AT 3,31;" "
75 FOR I=1 TO 6
80 PRINT "1";TAB 31;" " ;TAB 3
1;TAB 31;" "
85 NEXT I
90 FOR I=2 TO 14
95 PRINT AT I,15; PAPER 7;" "
100 NEXT I

```

```

105 PRINT PAPER 4;L$
110 FOR N=16 TO 21: PRINT AT N,
0; PAPER 4;" "
    "; NEXT N
115 GO SUB 4950
120 INK 0
125 LET P=0: LET D=0
130 PRINT FLASH 1; PAPER 6;AT
17,13;" ANTE "; GO SUB 4770
135 PAUSE 60
140 LET H=0: LET A=2: LET B=4;
GO SUB 6000
145 LET P(1)=V: LET X$(1)=A$(F,
4)
150 LET A=8: GO SUB 6000
155 LET P(2)=V: LET X$(2)=A$(F,
4)
160 LET H=1: LET A=18: GO SUB 6
000
165 LET H=0: LET A=24: GO SUB 6
000
170 LET A=2: LET D(2)=V: LET Y$
(2)=A$(F,4)
175 GO SUB 4000
180 GO SUB 4750
200 LET B=8
210 FOR K=2 TO 8 STEP 3
220 LET A=K
230 GO SUB 6000
240 GO SUB 260+K
250 GO SUB 4000+(K*10)
251 GO SUB 4280
252 IF K>2 THEN GO TO 358

```



```

255 GO TO 300
260 NEXT K: GO TO 400
262 LET P(3)=V: LET X$(3)=A$(F,
4): RETURN
265 LET P(4)=V: LET X$(4)=A$(F,
4): RETURN
268 LET P(5)=V: LET X$(5)=A$(F,
4): RETURN
300 FOR I=18 TO 24 STEP 3
310 LET A=I
320 GO SUB 6000
330 GO SUB 360+((I/3)-5)
340 GO SUB 4300+(I+2)
345 IF I=24 THEN IF DR>=1 AND
DR>=PR AND DL>PL THEN GO TO 511
0
350 GO SUB 4750
355 GO TO 260
358 NEXT I
360 GO TO 400
361 LET D(3)=V: LET Y$(3)=A$(F,
4): RETURN
362 LET D(4)=V: LET Y$(4)=A$(F,
4): RETURN
363 LET D(5)=V: LET Y$(5)=A$(F,
4): RETURN
400 LET B=4: LET A=18
410 GO SUB 6000
420 LET D(1)=V: LET Y$(1)=A$(F,
4)
430 GO SUB 4400
435 GO SUB 4630
440 GO TO 5000
1000 DIM A(5): FOR N=1 TO 5
1010 LET A(N)=P(N)
1020 NEXT N: GO SUB 1150: RETURN
1030 DIM A(5): FOR N=1 TO 5
1035 LET A(N)=D(N)
1140 NEXT N: GO SUB 1150: RETURN
1150 LET STR=0: FOR N=1 TO 4
1160 FOR M=1 TO 5-N
1170 LET C=A(M)
1180 LET D=A(M+1)

```



```

1190 IF C<=D THEN GO TO 1220
1200 LET A(M)=D
1210 LET A(M+1)=C
1220 NEXT M
1230 NEXT N
1240 FOR N=2 TO 5
1250 IF A(N)=A(N-1)+1 THEN GO TO 1270
1260 RETURN
1270 NEXT N
1280 LET STR=1: RETURN
3999 STOP
4000 IF P(2)=P(1) THEN LET PL=P(2): GO TO 4150
4010 RETURN
4020 IF P(3)=P(1) OR P(3)=P(2) THEN LET PL=P(3): GO TO 4150
4030 RETURN
4040 IF PR=1 THEN IF P(3)=P(1) AND P(3)=P(2) THEN LET PL=P(3): GO TO 4190
4050 RETURN
4060 IF PR=1 THEN IF P(4)=P(1) AND P(4)=P(2) OR P(4)=P(1) AND P(4)=P(3) OR P(4)=P(2) AND P(4)=P(3) THEN LET PL=P(4): GO TO 4190
4070 RETURN
4080 IF PR=3 THEN IF P(5)=P(1) AND P(5)=P(2) OR P(5)=P(1) AND P(5)=P(3) OR P(5)=P(2) AND P(5)=P(3) THEN LET PL=P(5): GO TO 4200
4090 IF PR=3 THEN IF P(5)=P(2) OR P(5)=P(3) OR P(5)=P(4) THEN LET PL=P(5): GO TO 4200
4100 IF PR=2 THEN IF P(5)=P(1) AND P(5)=P(2) OR P(5)=P(1) AND P(5)=P(3) OR P(5)=P(2) AND P(5)=P(3) OR P(5)=P(2) AND P(5)=P(4) OR P(5)=P(3) AND P(5)=P(4) THEN LET PL=P(5): GO TO 4190
4110 IF PR=1 THEN IF P(5)=P(1) AND P(5)=P(2) OR P(5)=P(1) AND P(5)=P(3) OR P(5)=P(2) AND P(5)=P(3) OR P(5)=P(2) AND P(5)=P(4) OR P(5)=P(3) AND P(5)=P(4) THEN LET PL=P(5): GO TO 4150
4120 IF P(5)=P(1) OR P(5)=P(2) OR P(5)=P(3) OR P(5)=P(4) THEN LET PL=P(5): GO TO 4150
4130 RETURN
4140 LET PR=PR+1
4150 IF PR=1 THEN PRINT INK 2; AT 16,2;"ONE PAIR"; INK 1; AT 17,2;"*****"; BEEP .3,10
4170 IF PR=2 THEN PRINT INK 2; AT 16,2;"TWO"; BEEP .3,10; BEEP .3,10
4180 RETURN
4190 LET PR=PR+1
4200 LET PR=PR+1
4210 IF PR=5 THEN GO TO 4260
4220 IF PR=3 THEN PRINT INK 2; AT 16,1;"THREE"; AT 17,1;"OF A KIND"; INK 1; AT 18,1;"*****"; BEEP .2,10; BEEP .2,10; BEEP .2,10
4230 IF PR=3 THEN RETURN
4240 IF PR=4 THEN PRINT INK 2; AT 16,1;"FOUR"; AT 17,1;"OF A KIND"; INK 1; AT 18,1;"*****"; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10
4250 RETURN
4260 IF PR=5 THEN PRINT INK 2; AT 16,0;"FULL HOUSE"; INK 1; AT 17,0;"*****"; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10; BEEP .2,10
4270 RETURN
4280 IF X*(1)=X*(2) THEN IF X*(

```

```


2)=X*(3) THEN IF X*(3)=X*(4) THEN IF X*(4)=X*(5) THEN LET PR=6
4290 IF PR=6 THEN PRINT INK 2; AT 16,1;"FLUSH"; INK 1; AT 17,1;"*****"; FOR N=1 TO 10: BEEP .2,10; NEXT N
4291 GO SUB 1000: IF STR=1 THEN LET PR=7
4292 IF PR=7 THEN PRINT INK 2; AT 16,1;"STRAIGHT"; INK 1; AT 17,1;"*****"; FOR N=1 TO 10: BEEP .2,10; NEXT N
4300 RETURN
4320 IF D(3)=D(2) THEN LET DL=D(2): GO TO 4490
4321 RETURN
4323 IF DR=1 THEN IF D(4)=D(2) AND D(4)=D(3) THEN LET DL=D(4): GO TO 4540
4324 IF D(4)=D(2) OR D(4)=D(3) THEN LET DL=D(4): GO TO 4490
4325 RETURN
4326 IF DR=3 THEN IF D(5)=D(2) AND D(5)=D(3) AND D(5)=D(4) THEN LET DL=D(5): GO TO 4540
4370 IF DR=1 THEN IF D(5)=D(2) AND D(5)=D(3) OR D(5)=D(2) AND D(5)=D(4) OR D(5)=D(3) AND D(5)=D(4) THEN LET DL=D(5): GO TO 4540
4380 IF D(5)=D(2) OR D(5)=D(3) OR D(5)=D(4) THEN LET DL=D(5): GO TO 4490
4390 RETURN

```

```

4400 IF DR=3 THEN IF D(1)=D(2) AND D(1)=D(3) OR D(1)=D(2) AND D(1)=D(4) OR D(1)=D(3) AND D(1)=D(4) AND D(1)=D(5) THEN LET DL=D(1): GO TO 4540
4410 IF DR=2 THEN IF D(1)=D(2) OR D(1)=D(3) OR D(1)=D(4) THEN LET DL=D(1): GO TO 4530
4420 IF DR=1 THEN IF D(1)=D(2) AND D(2)=D(3) OR D(1)=D(2) AND D(2)=D(4) OR D(1)=D(2) AND D(2)=D(5) OR D(1)=D(3) AND D(3)=D(4) OR D(1)=D(3) AND D(3)=D(5) OR D(1)=D(4) AND D(4)=D(5) THEN LET DL=D(1): GO TO 4540
4430 IF DR=1 THEN IF D(1)=D(2) OR D(1)=D(3) OR D(1)=D(4) OR D(1)=D(5) THEN LET DL=D(1): GO TO 4460
4440 IF D(1)=D(2) OR D(1)=D(3) OR D(1)=D(4) OR D(1)=D(5) THEN LET DL=D(1): GO TO 4460
4450 RETURN
4460 LET DR=DR+1
4480 GO TO 4500
4490 LET DR=DR+1
4500 IF DR=1 THEN PRINT INK 2; AT 16,2;"ONE PAIR"; INK 1; AT 17,2;"*****"; BEEP .3,2
4510 IF DR=2 THEN PRINT INK 2; AT 16,2;"TWO"; BEEP .3,2; BEEP .3,2

```



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```

4520 RETURN
4530 LET DR=DR+1
4540 LET DR=DR+1
4550 LET DR=DR+1
4560 IF DR=5 THEN GO TO 4610
4570 IF DR=3 THEN PRINT INK 2;
AT 16,21;" THREE ";AT 17,21;"O
F A KIND"; INK 1;AT 18,21;"~~~~~
~~~~~"; BEEP .2,2; BEEP .2,2; BE
EP .2,2
4580 IF DR=3 THEN RETURN
4590 IF DR=4 THEN PRINT INK 2;
AT 16,21;" FOUR ";AT 17,21;"O
F A KIND"; INK 1;AT 18,21;"~~~~~
~~~~~"; BEEP .2,2; BEEP .2,2; BEE
P .2,2; BEEP .2,2
4600 RETURN
4610 IF DR=5 THEN PRINT INK 2;
AT 16,21;"FULL HOUSE";AT 17,21;"
~~~~~"; FOR N=1 TO 8: BEEP
.2,2; NEXT N
4620 RETURN

4630 IF Y*(1)=Y*(2) THEN IF Y*(
2)=Y*(3) THEN IF Y*(3)=Y*(4) TH
EN IF Y*(4)=Y*(5) THEN LET DR=
6
4640 IF DR=6 THEN PRINT INK 2;
AT 16,21;" FLUSH ";AT 17,21;"~
~~~~~"; BEEP .2,2; BEEP .2,2; B
EEP .2,2; BEEP .2,2; BEEP .2,2
4650 GO SUB 1030; IF STR=1 THEN
LET DR=7
4655 IF DR=7 THEN PRINT INK 2;
AT 16,21;" STRAIGHT ";AT 17,21;"
~~~~~"; FOR N=1 TO 8: BEEP
.2,2; NEXT N
4660 RETURN
4670 BORDER 6: PAPER 6: CLS
4680 PRINT INK 0;AT 9,10;"YOU'R
E BROKE";AT 11,1;"SEE YOUR BANKE
R AND COME BACK."
4690 PAUSE 0
4700 STOP
4710 PRINT AT 19,0;"YOU NOW
";AT 20,0;"HAVE-$ ";ST
4720 IF ST<10 THEN PRINT AT 20,
8;" "
4730 IF ST<100 THEN PRINT AT 20
,9;" "
4740 IF ST<=0 THEN GO TO 4670
4750 PRINT FLASH 1; PAPER 6;AT
16,13;" BET "
4760 PRINT AT 17,15;" "
4770 PRINT AT 19,0;"YOU NOW ";
AT 20,0;"HAVE-$ ";ST: IF ST<100
THEN PRINT AT 20,9;" "
4780 INPUT W
4790 PRINT AT 16,13;" "
4800 LET W=INT W
4810 IF W>10 THEN PRINT AT 17,1
3;"SORRY,";AT 18,13;"LIMIT";AT 1
9,11;" "
4820 IF W>10 THEN PAUSE 150
4830 IF W>10 THEN PRINT AT 17,1
3;" ";AT 18,13;" ";AT
19,11;" "
4840 IF W>10 THEN GO TO 4740
4850 IF W<1 THEN PRINT AT 16,11
; PAPER 5; FLASH 1;" YOU ";A
T 17,11;" CHOSE ";AT 18,11;"
TO GO ";AT 19,11;" OUT! "; B
EEP 1,-15; PAUSE 150; GO TO 5120
4860 LET ST=ST-W
4870 LET T=T+2*W
4880 PRINT AT 17,13;" ";AT
18,13;" ";AT 19,11;" "
4890 PRINT AT 20,7;ST
4900 IF ST<10 THEN PRINT AT 20,
8;" "
4910 IF ST<100 THEN PRINT AT 20
,9;" "
4920 IF T<100 THEN PRINT AT 19,
11;"TOTAL*";T
4930 IF T>=100 THEN PRINT AT 19
,11;"TOTAL*";T

```

```

4940 RETURN
4950 FOR I=16 TO 20
4960 PRINT AT I,10; PAPER 4;" I";
AT I,20;" "
4970 NEXT I
4980 PRINT AT 15,10; PAPER 4;"~
~~~~~"
4985 FOR N=16 TO 19: PRINT AT N,
11; PAPER 7; INK 1;" "
NEXT N
4990 PRINT AT 20,10; PAPER 4;" "
; PAPER 0; INK 9;" THE POT "; PA
PER 4;" "
4995 RETURN
5010 IF PR>DR THEN GO TO 5060
5015 IF DR>PR THEN GO TO 5110
5020 IF PR=0 AND DR=0 THEN GO T
O 5130
5030 IF PR=DR AND PL>DL THEN GO
TO 5060
5040 IF PR=DR AND DL>PL THEN GO
TO 5110
5050 GO TO 5130
5060 PAUSE 80
5070 PRINT FLASH 1; INK 1;AT 16
,1;" WINNER "; FLASH 0; INK 0;A
T 17,1;" ";AT 17,3;"* "
T: FOR N=1 TO 8: BEEP .1,10; NEX
T N
5080 LET ST=ST+T
5090 PRINT AT 20,7;ST
5100 GO TO 5130
5110 PAUSE 80
5120 PRINT FLASH 1; INK 1;AT 16
,21;" WINNER "; FLASH 0; INK 0;
AT 17,21;" ";AT 17,23;"* "
T: FOR N=1 TO 8: BEEP .1,-10;
NEXT N
5130 PRINT AT 16,11; PAPER 6; FL
ASH 1;" PLAY ";AT 17,11;" AND
THER ";AT 18,11;" HAND? ";AT 1
9,11;" (Y/N) "
5140 PAUSE 0
5150 IF INKEY$="N" THEN GO TO 5
160
5155 GO TO 11
5160 BORDER 3: PAPER 3; INK 7; C
LS
5170 PRINT AT 10,1;"HOPE YOU HAD
FUN---COME AGAIN."
5180 PAUSE 0
5190 STOP
6000 FOR C=1 TO 2
6010 PRINT AT B,A;"FJJJG"
6020 FOR N=B+1 TO B+5
6030 PRINT AT N,A;"K K"
6040 NEXT N
6050 PRINT AT B+6,A;"HJJJI"
6060 NEXT C
6065 BEEP .01,10
6070 IF H=1 THEN GO TO 6130
6080 GO SUB 7000
6090 PRINT AT B+1,A+1; INK X;A*(
F,4);AT B+3,A+1; INK 0;A*(F,2 TO
3);AT B+5,A+3; INK X;A*(F,4)
6100 LET V=0; GO SUB 7040
6110 LET A*(F,1)="1"
6120 RETURN
6130 FOR N=B+1 TO B+5
6140 PRINT AT N,A;"K"; INK 1;"EE
E"; INK 0;"K"
6150 NEXT N: RETURN
6600 LET F=INT (RND*52)+1
6610 IF A*(F,4)<>"0" THEN GO TO
1620
6620 LET X=0
6630 IF A*(F,1)="2" OR A*(F,1)="
4" THEN LET X=2
6640 RETURN
7000 LET F=INT (RND*52)+1
7010 IF A*(F,1)<>"0" THEN GO TO
7000
7020 LET X=0; IF A*(F,4)="A" OR
A*(F,4)="D" THEN LET X=2
7030 RETURN
7040 IF A*(F,2 TO 3)="A" THEN
LET V=14; RETURN

```

```

7050 IF A*(F,2 TO 3)="J" THEN
LET V=11; RETURN
7060 IF A*(F,2 TO 3)="Q" THEN
LET V=12; RETURN
7070 IF A*(F,2 TO 3)="K" THEN
LET V=13; RETURN
7080 LET V=VAL A*(F,2 TO 3)
7090 RETURN
8000 DIM A$(52,4): DIM F(5): DIM
D(5)
8001 LET A$(1)="# 0 AA"
8002 LET A$(2)="# 0 2A"
8003 LET A$(3)="# 0 3A"
8004 LET A$(4)="# 0 4A"
8005 LET A$(5)="# 0 5A"
8006 LET A$(6)="# 0 6A"
8007 LET A$(7)="# 0 7A"
8008 LET A$(8)="# 0 8A"
8009 LET A$(9)="# 0 9A"
8010 LET A$(10)="# 0 10A"
8011 LET A$(11)="# 0 JA"
8012 LET A$(12)="# 0 QA"
8013 LET A$(13)="# 0 KA"
8014 LET A$(14)="# 0 AB"
8015 LET A$(15)="# 0 2B"
8016 LET A$(16)="# 0 3B"
8017 LET A$(17)="# 0 4B"
8018 LET A$(18)="# 0 5B"
8019 LET A$(19)="# 0 6B"
8020 LET A$(20)="# 0 7B"
8021 LET A$(21)="# 0 8B"
8022 LET A$(22)="# 0 9B"
8023 LET A$(23)="# 0 10B"
8024 LET A$(24)="# 0 JB"
8025 LET A$(25)="# 0 QB"
8026 LET A$(26)="# 0 KB"
8027 LET A$(27)="# 0 AC"
8028 LET A$(28)="# 0 2C"
8029 LET A$(29)="# 0 3C"
8030 LET A$(30)="# 0 4C"
8031 LET A$(31)="# 0 5C"
8032 LET A$(32)="# 0 6C"
8033 LET A$(33)="# 0 7C"
8034 LET A$(34)="# 0 8C"
8035 LET A$(35)="# 0 9C"
8036 LET A$(36)="# 0 10C"
8037 LET A$(37)="# 0 JC"
8038 LET A$(38)="# 0 QC"
8039 LET A$(39)="# 0 KC"
8040 LET A$(40)="# 0 AD"
8041 LET A$(41)="# 0 2D"
8042 LET A$(42)="# 0 3D"
8043 LET A$(43)="# 0 4D"
8044 LET A$(44)="# 0 5D"
8045 LET A$(45)="# 0 6D"
8046 LET A$(46)="# 0 7D"
8047 LET A$(47)="# 0 8D"
8048 LET A$(48)="# 0 9D"
8049 LET A$(49)="# 0 10D"
8050 LET A$(50)="# 0 JD"
8051 LET A$(51)="# 0 QD"
8052 LET A$(52)="# 0 KD"
8053 RETURN
9000 RESTORE : FOR a=USR "a" TO
USR "k"+7
9010 READ user: POKE a,user
9020 NEXT a: GO TO 10
9030 DATA 24,60,126,255,255,126,
60,24
9040 DATA 28,28,8,107,127,107,8,
28
9050 DATA 16,56,124,254,254,254,
16,56
9060 DATA 102,255,255,255,255,12
6,60,24
9070 DATA 204,204,51,51,204,204,
51,51
9080 DATA 0,0,0,7,15,12,24,24
9090 DATA 0,0,0,192,240,48,24,24
9100 DATA 24,24,12,15,7,0,0,0
9110 DATA 24,24,48,240,192,0,0,0
9120 DATA 0,0,0,255,255,0,0,0
9130 DATA 24,24,24,24,24,24,24,2
4
9990 REM a b c d e f g h i j k
9991 REM A B C D E F G H I J K
9992 BORDER 7: PAPER 7: INK 0: C
LS : STOP
9993 SAVE "STUD POKER" LINE 9000
9994 GO TO 10

```

# WARREN'S 2068 BASIC'S

## Horizontal Bar Chart

Warren Fricke

HORIZONTAL BAR CHART is a routine in BASIC for the TS2068 with an attached TS2040 printer. The purpose of the routine is two-fold. One, it is a relatively short program that provides a bar chart to illustrate the comparative status of a number of items (up to 20) in an inventory. Two, it demonstrates one way in which the 2040 printer can print out and "couple" automatically several screens full of data, and print it as a single illustration.

This program will print out one screen full, or two screens full, as the number of items requires.

For example, we input data on 15 assumed and related items, in this case various fruits. We also included make-believe quantities and a title, in response to LINE 55 of the program. The routine is universal. You may enter any related items and respective quantities. The item name is limited to 12 characters, in LINE 20. We also elected to call this FIGURE 1, but again, this may be changed to suit your application. Usually bar charts are used for a group of related items of 5 or more. Less than this and a pie chart may be a better choice.

In order to understand the arithmetic of the PLOT and PRINT AT lines, such as 240, 250, 530 and 640, you should refer to a screen chart for the computer. There is one on page 152 of the User Manual.

```

1 REM ** HORIZONTAL BAR CHART
2 REM ** "D-30", 3-17-88, WF

5 REM ** ENTER DATA
8 LET max=0: POKE 23658,8
10 INPUT "How many items, 5 to
20? ";I
15 IF I>20 THEN GO TO 10
20 DIM A$(I,12): DIM Q(I)
30 FOR n=1 TO I
40 INPUT "Enter item No. ",(n)
, and quantity ";A$(n),Q(n)
45 IF Q(n)>max THEN LET max=Q(n)
50 NEXT n
55 INPUT "Enter title. Maximum
m of 32 characters. ",B$
200 REM ** PLOT DATA
210 LET U=160
220 FOR m=1 TO I
230 FOR n=0 TO 2
240 PLOT 0,U+8*n DRAW 253*Q(m)
/max,0: NEXT n
250 PRINT AT 21-U/8,1;A$(m);" =
",Q(m);" units."
260 LET U=U-16
270 IF m=10 AND I=10 OR m>10 AND
I>10 THEN GO TO 530
280 NEXT m
290 PRINT AT 19,16-LEN B$/2,B$.
AT 20,12;"FIGURE 1"
300 PLOT 0,0: DRAW 0,175 DRAW
255,0 DRAW 0,-175 DRAW -255,0
COPY: STOP

```

APPLES	= 100 units.
AVOCADOS	= 20 units.
BANANAS	= 2 units.
BLUE BERRIES	= 50 units.
CHERRIES	= 72 units.
GRAPES	= 15 units.
GRAPE FRUIT	= 25 units.
LEMONS	= 30 units.
LIMES	= 11 units.
ORANGES	= 115 units.
PEACHES	= 62 units.
PEARS	= 35 units.
PINEAPPLES	= 27 units.
PLUMS	= 12 units.
TANGERINES	= 7 units.

INVENTORY OF FRUIT  
FIGURE 1

```

500 PLOT 0,0: DRAW 0,175 DRAW
255,0 DRAW 0,-175 COPY: CLS
510 IF I>12 THEN GO 308 600
520 PRINT AT 19,16-LEN B$/2,B$.
AT 20,12;"FIGURE 1"
530 PLOT 0,175 DRAW 0,-175 DR
AW 255,0 DRAW 0,175 COPY: STO
P
600 REM ** PLOT CONTINUATION
of DATA
625 LET U=160
610 FOR m=12 TO I
620 FOR n=0 TO 2
630 PLOT 0,U+8*n DRAW 253*Q(m)
/max,0: NEXT n
640 PRINT AT 21-U/8,1,A$(m);" =
",Q(m);" units."
650 LET U=U-16
670 NEXT m: RETURN

```

## A BROKEN 2068? FIX IT YOURSELF!

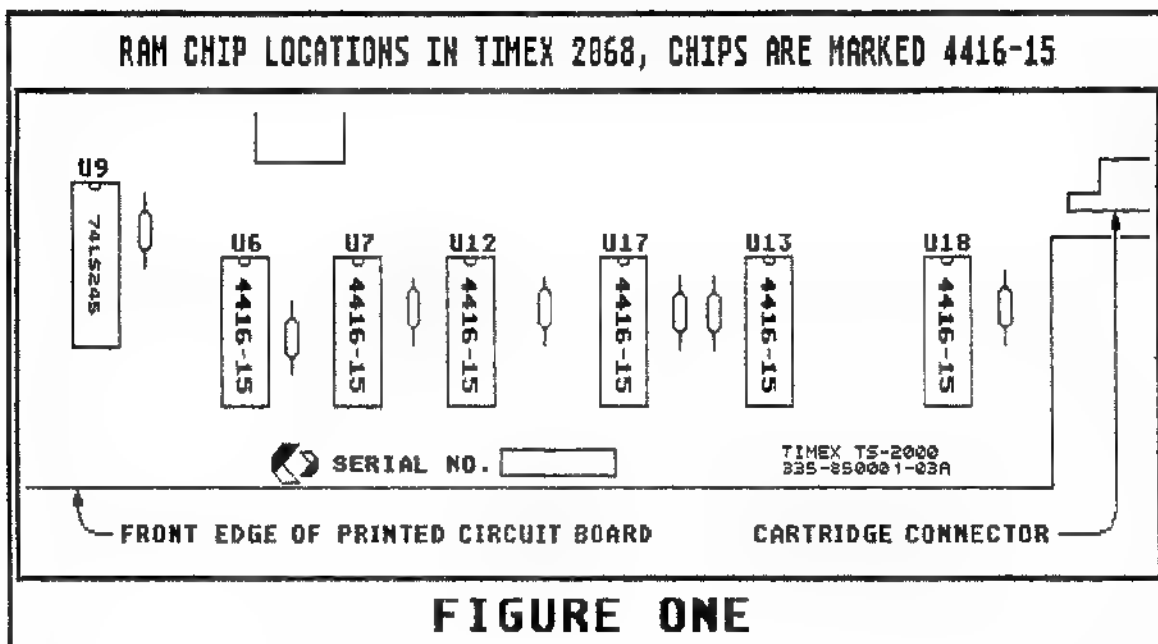
by John M. Bell

**IMPORTANT NOTE:** The following article describes a method of testing for, and repairing a Timex Sinclair 2068 with bad RAM chips. Though it is a simple project that most people with basic soldering skills are capable of completing, and the information presented here is believed to be correct, the author and publisher take no responsibility for any damage done to the computer (or hobbyist) as a result of, or while using this information.

The most common cause of a Timex Sinclair 2068 not working is burnt-out RAM chips. The chip(s) are usually destroyed when turning on the computer with a printer or disk interface attached. Though I have no way of proving it, the most likely cause is a high voltage "glitch" produced by the switching regulator when it is "powered-up" under a heavy load. Note that one or all of the chips can burn out, and in any combination.

There are three symptoms that may indicate bad RAM chips. The first is a blank screen when the computer is turned on. This suggests either a "brain





dead" 2068 (the SCLD...or "square chip" is destroyed, and is VERY difficult to replace, IF you can get one), or that most of the RAM chips have burnt out. The second symptom is a display that consists of a white border around a screen of "garbage". This indicates that at least one of the RAM chips in the first 16K bank is bad. The last and most obvious symptom is the free memory after power up is less than 38652 bytes (using the PRINT FREE command). If a Spectrum ROM is installed in the computer, the original Timex ROM will have to be replaced to use the FREE command.

If your machine exhibits any of these symptoms, there is a chance it can be easily repaired. First, the computer's PC board must be completely removed from its case. Save all the screws and be careful to avoid damaging the keyboard ribbon cable. Place the PC board on a non-conductive work surface and plug it in. Leave it turned on for a few minutes and then check each of the RAM chips for overheating (see Figure One for the chip locations). If any of the chips are hot to the touch, they are bad and need replacing. Mark them for removal. If none of the chips are hot and the computer still displays a black screen, the problem is probably not with the RAM chips. Consider sending the machine out for repair (to Dan Elliott of Promise Land Electronics--see May/June 88 issue of TDM for address listing). If the computer displays a border around a screen of garbage, chips U6 and/or U7 may have gone bad. If a normal sign on the screen is displayed, but only 22268 bytes are "free", chips U16 and/or U17 may have gone bad. If 5884 bytes are free, chips U12 and/or U13 and possibly U16 and/or U17 may have gone bad.

The chips that are hot to the touch should now be removed. Don't bother trying to remove them in one piece. Just cut or clip pins near the body of the chip, and remove the remaining pins from the PC board with a hot soldering iron and tweezers. If the chips are suspected to be bad but are not getting hot, a more difficult problem exists. The chips can be clipped off the board and discarded, or removed in one piece. If the chip is clipped off, you will never know if it was good or bad, and it will have to be replaced. If the chip is removed in one piece (a very difficult task), the chip can be saved for testing and possible re-use...but only at the risk of possibly damaging the PC board. Make your own decision.

Once the chips have been removed, the computer should be tested again. Connect it to a monitor and turn it on. If any of the remaining RAM chips are now getting hot, they should also be removed. If the display was formerly black, and now displays the

normal copyright message, but with reduced RAM available, the chips can be replaced and computer should work fine. If a border is displayed around a screen of garbage, and chips U6 and U7 are still on the board, one or both of them may also be bad. Remove them for replacement or testing.

New RAM chips for the computer will have to be purchased. The 2068 uses 4416-15's, which are 16K\*4 RAM chips. The 15 in the chip number designates speed. In this case 150 ns (nano seconds). Purchase either 120 or 150 ns chips, as the slower 200 ns chips will not work. Radio Shack does not sell them, so they must be mail-ordered (suppliers listed at the end of the article). Consider purchasing extra RAM chips, so that if one of the RAM chips left on the board is bad, you won't have to re-order. Don't even think about soldering the chips in. Purchase IC sockets along with the chips. Sockets make it easy to remove a chip for testing, and at twenty cents each, are a lot cheaper than cutting a \$4.00 RAM chip off the board.

The sockets should now be soldered in place where the RAM chips once were. If the holes on the PC board are filled with solder, they will first have to be cleared. The best method I have found is to hold the PC board vertically in a vice, melt the solder from one side of the board with a soldering iron and use a solder pump to suck the molten solder out from the other side. Remove any solder splashes or excess flux from the PC board and solder the sockets into place using rosin core solder.

Insert the new RAM chips into the sockets with the notch end of the chip pointing to the back of the PC board. Test the computer out of the case once again as described in paragraphs two and three. If everything checks out fine, the computer can be re-installed in the case and used as normal. If the computer still does not work or has reduced RAM available, there are two possible reasons. Either there is yet another bad RAM chip (new or old), or another chip in the computer is damaged, but still operates. Re-test the computer for bad RAM chips, and if none can be found, consider having the computer professionally repaired.

#### SUPPLIERS:

JDR Microdevices, 110 Knowles Drive, Los Gatos, CA 95030, (800) 538-5000. Takes VISA & M-CARD, \$10 min. order.

JAMECO Electronics, 1355 Shoreway Road, Belmont, CA 94002, (415) 592-8097. Takes VISA & M-CARD, \$20 min. order.

# curry computer

P.O. BOX 5607  
GLENDALE, AZ 86312-5607  
(602) 978-2902

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Organizer\ Home Asset\ Home Improve.\ VuCalc\ Geometry\  
Pioneer Trail\ Damper-Glooper\ Croaka Crawler Plus many  
more - Write for a list.

T/S 1000 Computer (2K) with 3 Programs - \$22.95

SOFTWARE for the T/S 2068:  
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Onlys', write for a list.

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# Mass-Storage CASSETTE TAPE STORAGE

## 2068 PROGRAM INDEX

by V. Phillip Hosey

This simple program is easily adaptable to virtually any computer. It not only provides a modicum of security, but files all your stored programs by digital location on tape, eliminating a lengthy title-by-title search. I always incorporate an attention-getting BEEP at the beginning of each program SAVED LINE 1 so that I may divert to other

productive activities while passing the few minutes delay required for LOADING lengthy data. One last note LINE 0 was obtained from Randall Larson's 'NO DELETE PROGRAM' listed in the NOV/DEC '87 issue of TDM ("In The Mailbag"). Originally intended for the Spectrum, it functions perfectly without modification on the T92068.

```

O>REM 1985:V. Phillip Hosey
1 PRINT "STOP TAPE:CODE?": INPUT A$: IF A$ } I use my computer's serial
$<>"(any CODE you want)" THEN NEW          number as an access code.
10 BORDER 0: PAPER 0: FOR 1=0 TO 21: CLS :
PRINT INK 7;AT 1,0;": V. Phillip Hosey/T
S-2068:1985": BEEP .01,-1: NEXT 1
20 INK 2: CIRCLE 80,92,81
23 INK 4: CIRCLE 207,55,43
25 INK 1: CIRCLE 198,136,32
30 PRINT INK 6;AT 2,10;"1";AT 3,7;"Progra
m";AT 4,7;"-INDEX-";AT 14,23;"16k=90";AT 15
,23;"second";AT 16,22;"loadtime";AT 4,22;"I
NKEY$"; FLASH 1;AT 5,24;"#?": FLASH 0
40 FOR n=0 TO 9: READ A$: PRINT INK 3;AT
n+6,2;n;": INK 7;A$: NEXT n
50 FOR y=0 TO 31: PRINT INK 7;AT 21,y;".
:AT 21,y;":
60 IF INKEY$="" THEN NEXT y: BEEP .01,9:
GO TO 50

```

```

65 IF INKEY$="" THEN GO TO 95
81 IF INKEY$="1" THEN LET t=15
82 IF INKEY$="2" THEN LET t=46
83 IF INKEY$="3" THEN LET t=56
84 IF INKEY$="4" THEN LET t=70
85 IF INKEY$="5" THEN LET t=110
86 IF INKEY$="6" THEN LET t=145
87 IF INKEY$="7" THEN LET t=165
88 IF INKEY$="8" THEN LET t=200
89 IF INKEY$="9" THEN LET t=300
90 PRINT INK 5;AT 3,22;"Start ";AT 4,22;"
Tape ";AT 5,22;" Now ";AT 14,23;"Fast- ";
AT 15,23;"Forward";AT 16,22;" Tape To"; FLA
SH 1;AT 17,25;t;AT 21,7;"* PAUSE TO LOAD
";INKEY$: FLASH 0: INK 7: LOAD INKEY$
95 CLS : LIST 99: BEEP 1,30: PRINT : FLASH
1;"REWIND TAPE THEN SAVE ": FLASH 0
99 DATA "Index Editor","BattleStarXEMIT","
MScript Master","Printer Drive","Accounts:1
987","TS-2068 CDP","File Matrix","SmartMode
m","WordWright","Dive Guide"

```

You will insert these digital locations after SAVEing your programs. (Ignore these samples)

You can list program names in order prior to storage. (Ignore these samples)

## 2068 TURBOLOADER

by Floyd Chrysler  
(adapted from an original Spectrum program,  
with permission, by Esben Krag Hansen)

Do you have lots of programs on tape? Do you go crazy waiting for them to load? If you answered yes then you may be interested in this program to double the speed of your tape loads.

I was in the same position when I received the May 1985 issue of "Your Sinclair". Even though I have the AERCO FD-68 I still have lots of programs on tape I really didn't want to move to disk and I still make backup copies of important programs for long term storage. Using disk made my tape deck seem so slow.

In the magazine was a program by Esben Hansen for the Spectrum that allowed you to save and load programs at variable baud rates from 1500 (normal rate) to 3500 (more than double). I wanted to do this on a 2068 so I vowed to convert the program to work on my machine.

This was not as easy as I had thought. While a lot of the program was compatible with the 2068, by just changing the ROM calls, the calls to the tape handling routines were a problem. On the 2068 the tape routines are all in EXROM. It was either bankswitching or a rewrite to do the tape handling routines within the program. I chose the second and by some fiddling managed to get the program to work with most of the functions in the original and only use a little over 200 bytes more.

The program supports all the tape commands - Save, Load, Verify, and Merge. TurboLoader is invoked by a RANDOMIZE USR 63600. This is followed by the TurboLoader commands - LIST, PRINT, INPUT, or RUN. And finally your tape command - SAVE, LOAD, etc.

To save a screen at double speed:

```
RANDOMIZE USR 63600. RUN 3100: SAVE "pic" SCREENS
```

The keywords List, Print, Input, and Run will still work as normal except when they follow a RANDOMIZE USR 63600. When used as TurboLoader commands they have the following meaning:

**LIST** This command reads a header from tape and lists it on the screen. It displays program length, data length for code, start line, etc.  
ex: RANDOMIZE USR 63600: RUN 3100: SAVE "test" CODE 63600,600 LIST

**RUN** - This changes the baud rate. It must be followed by a number ranging from 1500 to 3500, in steps of 200 (1500,1700,1800, etc.). A good tape recorder should be able to handle at least 3100.

**INPUT-** This deals with the message start taps on SAVE's

INPUT 2 prints the TurboLoader message and the start tape message and waits for a keypress.

INPUT 1 print the TurboLoader message only and waits for a key press.

INPUT 0 prints nothing and goes right into the save without waiting for a key press.

**PRINT-** This deals with LOAD/VERIFY commands

Print 2 prints the turboLoader message and program names as they are found.

Print 0 nothing is printed.

PRINT 2 and INPUT 2 are the initial default values.

There is a lot of code to enter for TurboLoader. I have included a Hex loader program to make it a little easier. Enter the loader program and save it. The code is listed in three columns. The first is the address for that code line. Next is the code in blocks of 8 hex bytes. Last is a check digit.

When you run the hex loader it will ask you for a start address. The first time you should enter 63380. It will then ask for the code. Enter all 16 characters (8 hex bytes) and press enter. You will then be asked for the check number. Enter it and if all is ok the program will display the next address (which should match the next address in the code list), if there is an error the program will beep and redisplay the same address for you to reenter the line in error.

At any time you may enter STOP to the enter code message and you will be prompted to save the code entered to that point. You can then restart at a later time by reloading the code and loader program and entering the next address from where you left off at the prompt. When you have entered all the code the program will prompt you to save the code. Once you have all the code saved you can start speeding! Enter CLEAR 63379 LOAD "TURBO" CODE 63380. Remember the entry point to the program for all user calls is 63600.

Don't be intimidated by all the code. I'm sure you will find it worth the time to enter. If you have not yet spent the family fortune on a disk drive you will find this program invaluable.



## Hex Loader

```

30 DEF FN h(a$)=CODE a$-48-(7
AND a$>'9')
40 POKE 23658,8
50 INPUT "Start Address: ",start
60 IF start=63380 THEN GO TO 90
70 INPUT "Have you re-loaded c
ode?";z$
80 IF z$<>"Y" THEN PRINT "Lo
ad code and re-start": STOP
90 LET adr=start
100 FOR t=start TO 65444 STEP 8
110 LET sum=0
120 PRINT adr;" ";
130 INPUT "enter code ";c$
140 IF c$="STOP" THEN GO TO 38
0
150 IF LEN c$>16 THEN BEEP .2
5,,25: GO TO 130
160 FOR i=1 TO 8
170 LET a$=c$(2)

```

```

180 POKE adr,FN h(c$)+16+FN h(a
$)
190 PRINT c$(1);a$,
200 LET c$=c$(3 TO )
210 LET sum=sum+(PEEK adr)
220 LET adr=adr+1
230 NEXT i
240 INPUT "Check Number=",check
250 PRINT " ";sum
260 IF sum<>check THEN GO TO 3
40
270 NEXT t
280 PRINT "END OF CODE"
290 SAVE "TURBO"CODE 63380,2066
300 PRINT "VERIFY"
310 VERIFY "TURBO"CODE 63380
320 PRINT "FINISHED"
330 STOP
340 LET adr=adr-8
350 BEEP .5,1
360 PRINT "ERROR - RE-ENTER"
370 GO TO 110
380 INPUT "Do You want to Save
your work? (Y or N)";z$
390 IF z$="Y" THEN GO TO 290
400 STOP
599 SAVE "hexload" LINE 10

```

## TurboLoader Code

(ready for Hex Loader program)

addr	code	check	addr	code	check	addr	code	check
63380	CF1A7EE5C020191A	854	63828	20473A39FFFE03CA	1308	64276	FFA7ED4244D0CD3A	1133
63388	13BE2320E21A8E18	521	63836	ED1BE7CD702CCBF9	463	64284	FB180F3E031180FE	722
63396	2B3008E5E8EC2017	823	63844	300C210C003A39FF	463	64292	CD3F07ED4B33FFCD	1098
63404	E118ECCDF0F718E2	1427	63852	3D2B16C3911BC2ED	921	64300	3AFB3E041160FECD	947
63412	7E4FFE80C8E52148	1124	63860	1BCD89282818237E	634	64308	3F07ED4B31FFCDE9	1124
63420	5C7EFEB02825B928	902	63868	DD770B237EDD770C	864	64316	30CDA1313E0DD7C9	954
63428	08C5CD2017C1E818	917	63876	23DD710E3E01CB71	782	64324	CD231FDD710DD070	951
63436	FOE6E0F1A02012D1	1367	63884	2B013CDD7700EBE7	907	64332	0EDD3600002A595C	512
63444	D5E523131ABE2006	750	63892	FE2920DAE7EBC36D	1315	64340	ED5B535C37ED52DD	1098
63452	1730F7E11803E118	819	63900	F8FEAA201C3A39FF	1105	64348	750BDD740C2A4B5C	686
63460	E03EFFD1EB3C37CD	1305	63908	FE03CAED18E7DD36	1229	64356	ED5EDD750FDD7410	1024
63468	F0F718C420100822	787	63916	0B00DD360C1B2100	358	64364	EB3A39FFA7CA0DFD	1240
63476	5F5CEB8CD017CD50	967	63924	40DD750DD740E18	790	64372	E5011100DD09CDDC	887
63484	17EB2A5F5C0808D5	716	63932	4AFEAF204D3A39FF	582	64380	F8DDDE511100AF37	962
63492	CD2017225F5C2A53	606	63940	FE03CAED18E7CDE7	1390	64388	CDCEBDDDE130EF3A	1452
63500	5CE3C508380728CD	835	63948	21200C3A39FFA7CA	816	64396	3BFFA7280CCDC4F8	1162
63508	8B12231803CDBB12	677	63956	ED1BCD511C180FCD	822	64404	3EFECD3012FD3652	976
63516	23C1D1ED53535CED	1169	63964	E51BDDFF E2C280C3A	887	64412	030E80DD7E0DDDBE	803
63524	5B5F5CC5D5E8EDB0	1336	63972	39FFA7CAED18C051	1231	64420	EF20020EF6FE0430	839
63532	E1C1D5CD5017D1C9	1349	63980	1C1804E7CDE51BCD	953	64428	CD473A3BFFA77B28	875
63540	3D20FDA704C83E7F	906	63988	231FDD710DD7700C	756	64436	0811F8FEC5CD3F07	997
63548	DBFE1FD0A9E62028	1183	63996	CD231FDD710DD770	951	64444	C1DDDE5D121F0FF19	1405
63556	F3792F4FE607F608	981	64004	0E5069DD360003C3	688	64452	050A7E3C20037980	486
63564	D3FE37C9F53A485C	1188	64012	6DF8FECA2807DD36	1138	64460	4F131A8E2320010C	394
63572	E6380F0F0FD3FE3E	858	64020	0E80C34DFB3A39FF	1035	64468	3A3BFFA728021AD7	822
63580	7CDBFE1FFB3802CF	1147	64028	A7C2ED1BE7CDE51B	1317	64476	10EFCB79208B3A3B	938
63588	0CF1C90000000000	454	64036	C344FEE7CDE51BCD	1411	64484	FFA728063E0DD7C9	963
63596	000000000FF0028	530	64044	231FC5CDE9300184	850	64492	CD8E1DD7E00FE03	1282
63604	47FE3A2802CF0BFD	896	64052	00CDE930CF0538CD	728	64500	280C3A39FF3DC441	750
63612	340D2A5D5CE5E721	785	64060	1E1FFE0F3834FE24	728	64508	FCFE02CAEEFCDEDD	1650
63620	70F8E3FEF5280F5	1464	64068	3030D60FC8472024	673	64516	6EFAADD66F8DD5E08	1260
63628	ESCCDCF8E1F1FEE	1845	64076	CB27C827214DFF06	855	64524	DD560C7CB5280EED	915
63636	285F5FEF7CA27FAFE	1381	64084	004F08E8213DFF06	678	64532	5238272808DD7E00	572
63644	F0CA78FA0600FEF8	1320	64092	08C51A134E234623	468	64540	FE03C294F7E17CB5	1376
63652	286104FEFEF285C04	770	64100	02C110F53A1BFE32	845	64548	2006DD6E0DDDD680E	719
63660	FED6285704FED528	1106	64108	49FEC1ED4337FFC3	1329	64556	E5DD1E1A3A39FFFE02	1301
63668	52225D5CDFD350DE1	845	64116	CD8FC0F09E7FE0D28	1207	64564	372001A73EFFFCD8C	1160
63676	CD4F8ED4B765DCE9	1372	64124	06FE1A2802CFC0B11	595	64572	FDD8C394F7DD5E08	1385
63684	3A3BFFFE02C0C3A9	1184	64132	1100DD2126FFAF37	794	64580	DD560CE5F7C852006	891
63692	083A3CFFFE02C0CD	1034	64140	CDCEBDDDE130EF3A	1302	64588	131313E8180CD06E	659
63700	9A081160FEAFCD3F	987	64148	FE0430EBCDC4F83E	1252	64596	FADD6E6F8E837ED52	1433
63708	07ED4B37FFCD8617	993	64156	02CD301211F6FECDD	995	64604	3B091105001944D	257
63716	3E0DD7C8CD00F9FE	1199	64164	3F071127FF060A1A	423	64612	CD8B1FE1DD7E00A7	1162
63724	03D276FA323BFF18	969	64172	FE203001AFD71310	760	64620	283D7CB528132B46	578
63732	D8CD00F8FE0330F1	1216	64180	F63E0DD73A26FFA7	1054	64628	284E28030303DD22	428
63740	323CFFC9E7CDE51B	1258	64188	2822FE03285D3E05	531	64636	5F5CCDD5017DD2A5F	853
63748	C31E1F783239FFE7	969	64196	1160FECDD3F073A34	752	64644	5C2A595C28DD4E08	668
63756	CDEF18CD8928283D	954	64204	FFF5E61FC640D7F1	1479	64652	DD460CC5030303DD	730
63764	0111003A39FFA728	595	64212	CB7726033EE24D73E	740	64660	7EFD5FCD8B1223F1	1310
63772	020E22F7D5DD0E106	962	64220	DD7184EED4833FF	948	64668	77D1237323723E5	891
63780	083E20121310FCDD	631	64228	7826C02010C53E02	851	64676	DD1E1373E7F188F8E	1220
63788	3601FFCD4F2F21F6	1016	64236	1160FECDD3F07C1CD	1040	64684	2A595C280D225F5C	708
63796	FF0B080330103A39	457	64244	88173E0DD73E0B11	534	64692	DD4E08DD460CC5CD	1015
63804	FFA72003C3701478	904	64252	50FECDD3F07E4B35	890	64700	4D17C1E5C5DDB812	1129
63812	B1280A010A00DDE5	688	64260	FFC5CD3AFB3E0711	1052	64708	DD2A5F5C23DD4E0F	799
63820	E123E8EDBDDFFEE4	1613	64268	60FECDD3F07C12A31	909	64716	DD46100S224B5CDD	738
						64724	660E7CEEC0200ADD	925
						64732	6E0D22425CFD360A	632
						64740	00D1DDE1373E7FC3	1222

addr	code	check	64972	0815F37E0FD3FE21	847	65212	4620444154412042	482
64748	3AFCDD4E0BDD460C	923	64980	50F8E5DBFE1FE620	1323	65220	4C4F434BB8A15252	712
64755	C503F73B80E8D1E5	1302	64988	F6044FBFC0CD58FE	1262	65228	4159204E1140458A	661
64764	ESDDE1373EFFC03A	1310	64995	30FA21150410FE2B	653	65236	50524F4752414D20	568
64772	FCE1ED5B535CC3B6	1325	65004	7C8520F9CD57FE30	1180	65244	4C454E4754488A4C	712
64780	F7E53A3CFFA72824	1092	65012	E8069CCD57FE30E4	1219	65252	454E475448204F46	555
64788	3D200A3EFD0D3012	689	65020	3EC68830E02420F1	1025	65260	205641524941424C	545
64796	CDD9111B17CDA908	868	65028	06C9CD5BFE30D57B	1138	65268	4553BA0D50524F47	653
64804	CD0DF83E011160FE	1088	65036	FED430F4CD58FED0	1516	65276	52414DBA0D4E554D	663
64812	CD3F07CDD911CDA9	1088	65044	79EE084F260006B0	664	65284	4245522041525241	543
64820	08CDDCF8DDE51111	1150	65052	181F082007300FDD	385	65292	593A0D434B415241	639
64828	00AFCD52FDD0E106	1167	65060	7500180FCB11ADCC	741	65300	4354455220415252	563
64836	327610FDD05E0BDD	884	65068	791F4F131807DD7E	628	65308	41598A0D42595445	661
64844	560C3EFFDDE12150	974	65076	00ADCCDD0231B0806	662	65316	533A000000000000	259
64852	F8E521801FCB7F28	1039	65084	822E01CD57FED03E	1041	65324	0000000000000000	0
64860	0321980C0813DD2B	491	65092	C888CB1506B030F3	1084	65332	0000000000000002	227
64868	F33E044710FED3FE	1115	65100	7CAD677A8320C87C	1060	65340	0288F0A7FDADFDBB	1424
64876	EE0F08A42D20F505	750	65108	FE01C9CD58FED03E	1276	65348	FD1BFE3CFE44FE5C	1262
64884	25F268FD062F10FE	959	65116	16C334FB80545552	896	65356	FE3B423E31B032CB	1047
64892	D3FE3E0C063710FE	870	65124	424F4C4F4144207F	592	65364	16373D3A2D87B9D0	817
64900	D3FE010D3B086F1B	581	65132	313938362045482B	432	65372	1572393528DBFD04	813
64908	097AB32B08DD6E0C	692	65140	46432020242416544	485	65380	132E343124C4C509	813
64916	7CAD677A8320C87C	568	65148	BA20205354415254	648	65388	1229302C1FCACDD0	809
64924	6C18F579CB7810FE	1091	65156	205441504520414E	505	65396	10252B2B18D103E2	808
64932	3004064210FED3FE	859	65164	4420505245539320	529	65404	0F21272417D7D9E6	808
64940	063E20F05AF3CCB	782	65172	414E59204B45D953	708	65412	0D1C221F120E30E8	805
64948	1520EB18DD230671	626	65180	54415254204C494E	574	65420	0C181E1B0EE4E6F4	804
64956	3E7FDBFE1FD07A3C	1083	65188	45BA535441525420	685	65428	0A13191609E8D0F4	601
64964	20C7053B10FEC914	787	65196	41444452455353BA	704	65436	090F151205F1F3F8	800
			65204	4C454E475448204F	561	65444	0700000000000000	7

# BANK-SWITCHING RAM

## PRACTICAL 2068 BANK-SWITCHING

by Stan Lemke

Although some bank-switching applications might encompass seemingly insurmountable programming obstacles...there are many others that can be accomplished with ease! I'd like to present three bank-switching examples/applications that can be adapted and expanded on for a wide variety of uses.

### BANK SWITCHING THEORY--FROM A LAYMAN'S PERSPECTIVE

What is bank switching? In very simple terms, it is a way to direct the computer to switch between different "banks" of memory circuits. This is accomplished in a program with the OUT 244,VALUE command, where VALUE defines which memory "banks" are being used. Although the computer can only talk to 64K of memory (8 banks of 8K each) at any given time, BANK-SWITCHING can switch in/out different banks of memory...and make it appear like more memory. One little detail that makes this all possible, is that when you switch out one memory bank for another, the memory in that bank remains just the way you left it...so when you return to it, you can continue on just as before!

Another important detail is that we will only be working with memory above location 32768. By doing this, we will not interfere with the computer operating system and greatly simplify our work. This means that we will only have an additional 32K of RAM to work with, but that almost doubles the memory capacity we are currently working with after subtracting that used by the operating system!

Memory is "bank-switched" in 8K chunks using the OUT 244,VALUE command. VALUE determines which chunks are being used. The following table defines VALUE and the "DOCK" memory addresses that are used.

Now, by adding various values, one can activate multiple banks of dock memory (i.e., VALUE = 64+128 = 192 operates on addresses 49152 - 65535). To reset all banks to the standard memory, use VALUE = 0. NOTE: We will only be activating chunks with addresses above 32768 (VALUE = 16 and above). AERCO FD-68 Users: The AERCO disk system requires that chunk 1 be active to utilize the disk, therefore, add 1 to your VALUE to keep the disk active.

Value	Dock Memory Addressed
1	0 - 8191
2	8192 - 16383
4	16384 - 24575
8	24576 - 32767
16	32768 - 40959
32	40960 - 49151
64	49152 - 57343
128	57344 - 65535

### BANK-SWITCHING RAM (where to get it)

Add-on bank switchable RAM can be obtained from a variety of sources. The AERCO disk interface comes with 64K of additional bank-switchable RAM built right in. Another source is RAM cartridges that plug into the 2068 cartridge dock such as the one designed by Tom Bent (Quantum Levels), and once marketed by Thomas B. Woods, or the one available from Lem Software (see the ad on the back cover of this magazine for a 32K RAM cartridge). Other sources of RAM are available, like the new RAMdisk from LARKEN, and there are probably others that I am not aware of.

### WHAT CAN WE DO WITH IT?

OK, what can we do with this add-on memory? What is the #1 complaint about 64K computers? They have so little memory to work with! There is always more data than memory to hold it! The #1 use for more memory will be to store more data. So, my first example is a short data transfer program.

### XFER\_1 (LISTING A)

XFER\_1 is a ZEUS assembler source listing, ready to be assembled. LINE 270 is set to assemble this routine starting at 39000 (RANDOMIZE USR 39000). Following the source file is a dis-assembly of the

routine identifying the memory address, the value at that address, and the assembler instruction associated with that address. I would like to thank AL Schremmer, an active member of the Kansas Area TS User Group for writing this very helpful and unique dis-assembler!

XFER\_1 is a simple program that will transfer (COPY) data from one bank to another bank. As written, 24064 bytes of data are copied from standard memory starting at address 41300 to the dock bank, also starting at address 41300. The "source" bank is the source of the data to be copied...and could be the dock bank. The "destination" bank is where you are copying data to, and could be regular memory (with a little modification). Also, this example copies data to the same address in the dock bank, but you can see that this also can be changed easily.

The way it works is this: after assigning the destination and source addresses, and the number of bytes to be copied (LINES 290 to 310), the source bank is activated (LINES 430 and 440) and 1 byte is copied into the accumulator and saved by pushing it onto the stack (LINES 450 and 460). Then the destination bank is activated (LINES 570 and 580) and the saved byte is recalled and stored at it's destination address (LINES 590 and 600). The destination and source addresses are incremented (LINES 670 and 680) while the number of bytes that are to be copied is decremented (LINE 690). The number of bytes remaining is checked to see if it is zero (LINES 700 to 720), and if not, the process is repeated. When complete, the source bank is activated (LINES 730 and 740), and the program ends with a RETURN.

#### XFER\_2 (LISTING B)

A second form of data transfer useful in bank-switching is the ability to "swap" data between banks. This is the function of routine XFER\_2. Where XFER\_1 merely copied data from one bank/address to another, XFER\_2 performs a swap function, copying the data from the source into the destination, and then

placing the destination byte back into the source! This routine works much like XFER\_1 above. The key to this program is the use of the AF and alternate AF registers, and exchanging these to easily allow the exchange of the source/destination values.

#### XFER\_3 (LISTING C)

The third example is a merging of the source/destination data. This application superimposes the source data on the destination data using the "OR" function, and is equivalent of overlaying two pictures on a light board...ending up with one. I've used this function with my PIXEL PRINT PROFESSIONAL (desktop publisher) program, to combine (or merge) two PIXEL PRINT files. As you can see, the operation of the program is quite similar to the two above with a simple modification for the "OR" function. NOTE: both the source and destination addresses contain the merged data.

Now, I don't pretend to be a very good assembly programmer, so I am sure there are many other ways to do these jobs. But, if I have been able to show you enough to get your interest peaked, and convinced you that BANK-SWITCHING is not an impossible task, then I've accomplished my goal!

Keep TS2068-ing, and start taking advantage of 2068 BANK-SWITCHING.

#### XFER\_1

```

39000 > 33 > ld hl,NN
39001 > 84 <41300>
39002 > 161
39003 > 17 > ld de,NN
39004 > 84 <41300>
39005 > 161
39006 > 1 > ld bc,NN
39007 > 0 <24064>
39008 > 94
39009 > 62 > ld a,N
39010 > 1 <1>
39011 > 211 > out (N),a
39012 > 244 <244>
39013 > 26 > ld a,(de)
39014 > 245 > push af
39015 > 62 > ld a,N
39016 > 225 <225>
39017 > 211 > out (N),a
39018 > 244 <244>
39019 > 241 > pop af
39020 > 119 > ld (hl),a
39021 > 19 > inc de
39022 > 35 > inc hl
39023 > 11 > dec bc
39024 > 120 > ld a,b
39025 > 177 > or c
39026 > 32 > jr nz,D15
39027 > 237 <237>
39028 > 62 > ld a,N
39029 > 1 <1>
39030 > 211 > out (N),a
39031 > 244 <244>
39032 > 201 > ret
39033 > 0 > nop

```

#### LISTING A

```

00010 ; XFER_1
00020 ; -----
00030 ; PRACTICAL
00040 ; BANK-SWITCHING
00050 ;
00060 ; ++++++
00070 ; + THIS SAMPLE PROG. +
00080 ; + WILL COPY 24064 +
00090 ; + BYTES FROM MEMORY +
00100 ; + ADDRESS 4,300 OF +
00110 ; + STD. RAM TO 41300 +
00120 ; + OF THE DOCK BANK. +
00130 ; ++++++
00140 ;
00150 ; (c) S D LEMKE 1988
00160 ;
00170 ; LEMKE SOFTWARE DEVELOP.
00180 ; 2144 WHITE OAK
00190 ; WICHITA, KS. 67207
00200 ; -----
00210 ;
00220 ;
00230 ; GETTING STARTED...
00240 ; SET SOURCE, DEST, AND
00250 ; NUMBER OF BYTES
00260 ;
00270 ORG 39000 ; CODE ADD.
00280 ;
00290 LD HL,41300 ; DEST. ADD.
00300 LD DE,41300 ; SOURCE ADD.
00310 LD BC,24064 ; LENGTH
00320 ;
00330 ; -----
00340 ;
00350 ; BEGIN BY ENABLING THE
00360 ; SOURCE BANK AND SAVING
00370 ; THE SOURCE BYTE
00380 ;

```

```

00390 ; SOURCE BANK = 1 (AERCO)
00400 ; SOURCE BANK = 0 (OTHER)
00410 ;
00420 ;
00430 XFER1 LD A,1 ; SOURCE BANK
00440 OUT (244),A ; ENABLE IT
00450 LD A,(DE) ; LOAD S. VALUE
00460 PUSH AF ; SAVE IT
00470 ;
00480 ; -----
00490 ;
00500 ; NEXT, ENABLE THE DEST.
00510 ; BANK, AND STORE THE
00520 ; SOURCE BYTE THERE
00530 ;
00540 ; DEST BANK = 225 (AERCO)
00550 ; DEST BANK = 224 (OTHER)
00560 ;
00570 LD A,225 ; DESTINATION
00580 OUT (244),A ; ENABLE IT
00590 POP AF ; RECALL S. VALUE
00600 LD (HL),A ; STORE IT
00610 ; -----
00620 ;
00630 ; INCREMENT THE SOURCE
00640 ; AND DEST. ADDRESSES.
00650 ; CHECK TO SEE IF DONE.
00660 ;
00670 INC DE ; SOURCE + 1
00680 INC HL ; DEST. + 1
00690 DEC BC ; LENGTH - 1
00700 LD A,B ; "B" INTO ACC.
00710 OR C ; SUM WITH "C"
00720 JR NZ,XFER1 ; "BC" = 0 ?
00730 LD A,1 ; RESTORE S. BANK
00740 OUT (244),A ; ENABLE IT
00750 RET ; ALL DONE

```

#### LISTING B

```

00010 ; XFER_2
00020 ; -----
00030 ; PRACTICAL
00040 ; BANK-SWITCHING
00050 ;
00060 ; ++++++
00070 ; + THIS SAMPLE PROG. +
00080 ; + WILL SWAP 24064 +
00090 ; + BYTES FROM MEMORY +
00100 ; + ADDRESS 41300 OF +
00110 ; + STD RAM AND 41300 +
00120 ; + OF THE DOCK BANK. +
00130 ; ++++++
00140 ;
00150 ; (c) S D LEMKE 1988
00160 ;
00170 ; LEMKE SOFTWARE DEVELOP.
00180 ; 2144 WHITE OAK
00190 ; WICHITA, KS. 67207
00200 ; -----
00210 ;
00220 ;
00230 ; GETTING STARTED...
00240 ; SET SOURCE, DEST, AND
00250 ; NUMBER OF BYTES
00260 ;
00270 ORG 39000 ; CODE ADD.
00280 ;
00290 LD HL,41300 ; DEST. ADD.
00300 LD DE,41300 ; SOURCE ADD.
00310 LD BC,24064 ; LENGTH
00320 ;
00330 ; -----
00340 ;
00350 ; BEGIN BY ENABLING THE
00360 ; SOURCE BANK AND SAVING
00370 ; THE SOURCE BYTE
00380 ;
00390 ; SOURCE BANK = 1 (AERCO)
00400 ; SOURCE BANK = 0 (OTHER)

```



```

00410 ;
00420 ;
00430 XFER2 LD A,1 ; SOURCE BNK
00440 OUT (244),A ; ENABLE IT
00450 LD A,(DE) ; LOAD S. VALUE
00460 EX AF,AF' ; SAVE IT
00470 ;
00480 ; -----
00490 ;
00500 ; NEXT, ENABLE THE DEST.
00510 ; BANK, AND STORE THE
00520 ; SOURCE BYTE THERE
00530 ;
00540 ; DEST BANK = 225 (AERCO)
00550 ; DEST BANK = 224 (OTHER)
00560 ;
00570 LD A,225 ; DESTINATION
00580 OUT (244),A ; ENABLE IT
00590 LD A,(HL) ; LOAD D. VALUE
00600 EX AF,AF' ; SWAP VALUES
00610 LD (HL),A ; STORE DEST.
00620 ;
00630 ; ..... ENABLE THE SOURCE
00640 ; BANK, AND STORE THE
00650 ; DEST. BYTE THERE
00660 ;
00670 LD A,1 ; SOURCE BANK
00680 OUT (244),A ; ENABLE IT
00690 EX AF,AF' ; SWAP VALUES
00700 LD (DE),A ; STORE S. BYTE
00710 EX AF,AF' ; RESTORE AF
00720 ; -----
00730 ;
00740 ; INCREMENT THE SOURCE
00750 ; AND DEST. ADDRESSES.
00760 ; CHECK TO SEE IF DONE.
00770 ;
00780 INC DE ; SOURCE + 1
00790 INC HL ; DEST. + 1
00800 DEC BC ; LENGTH - 1
00810 LD A,B ; "B" INTO ACC.
00820 OR C ; SUM WITH "C"
00830 JR NZ,XFER2 ; "BC" = 0 ?
00840 LD A,1 ; RESTORE S. BANK
00850 OUT (244),A ; ENABLE IT
00860 RET ; ALL DONE

```

# LISTING C

```

00010 ; XFER_3
00020 ; -----
00030 ; PRACTICAL
00040 ; BANK-SWITCHING
00050 ;
00060 ; ++++++
00070 ; + THIS SAMPLE PROG. +
00080 ; + WILL MERGE 24064 +
00090 ; + BYTES FROM MEMORY +
00100 ; + ADDRESS 41300 OF +
00110 ; + STD RAM AND 41300 +
00120 ; + OF THE DOCK BANK. +
00130 ; ++++++
00140 ;
00150 ; (c) S D LEMKE 1988
00160 ;
00170 ; LEMKE SOFTWARE DEVELOP.
00180 ; 2144 WHITE OAK
00190 ; WICHITA, KS. 67207
00200 ; -----
00210 ;
00220 ;
00230 ; GETTING STARTED...
00240 ; SET SOURCE, DEST, AND
00250 ; NUMBER OF BYTES
00260 ;
00270 ORG 39000 ; CODE ADD.
00280 ;
00290 LD HL,41300 ; DEST. ADD.
00300 LD DE,41300 ; SOURCE ADD.
00310 LD BC,24064 ; LENGTH
00320 ;
00330 ; -----
00340 ;
00350 ; BEGIN BY ENABLING THE
00360 ; SOURCE BANK AND SAVING
00370 ; THE SOURCE BYTE
00380 ;
00390 ; SOURCE BANK = 1 (AERCO)
00400 ; SOURCE BANK = 0 (OTHER)
00410 ;
00420 ;
00430 XFER3 LD A,1 ; SOURCE BNK
00440 OUT (244),A ; ENABLE IT

```

```

00450 LD A,(DE) ; LOAD S. VALUE
00460 PUSH AF ; SAVE IT
00470 ;
00480 ; -----
00490 ;
00500 ; NEXT, ENABLE THE DEST.
00510 ; BANK, AND STORE THE
00520 ; SOURCE BYTE THERE
00530 ;
00540 ; DEST BANK = 225 (AERCO)
00550 ; DEST BANK = 224 (OTHER)
00560 ;
00570 LD A,225 ; DESTINATION
00580 OUT (244),A ; ENABLE IT
00590 POP AF ; RECALL S VALUE
00600 DR (HL) ; "OR" DEST VALUE
00610 LD (HL),A ; STORE DEST.
00620 PUSH AF ; SAVE SUM VALUE
00630 ;
00640 ; ..... ENABLE THE SOURCE
00650 ; BANK, AND STORE THE
00660 ; "SUM" THERE
00670 ;
00680 LD A,1 ; SOURCE BANK
00690 OUT (244),A ; ENABLE IT
00700 POP AF ; RECALL "SUM"
00710 LD (DE),A ; STORE S. BYTE
00720 ; -----
00730 ;
00740 ; INCREMENT THE SOURCE
00750 ; AND DEST. ADDRESSES.
00760 ; CHECK TO SEE IF DONE.
00770 ;
00780 INC DE ; SOURCE + 1
00790 INC HL ; DEST. + 1
00800 DEC BC ; LENGTH - 1
00810 LD A,B ; "B" INTO ACC.
00820 OR C ; SUM WITH "C"
00830 JR NZ,XFER3 ; "BC" = 0 ?
00840 LD A,1 ; RESTORE S. BANK
00850 OUT (244),A ; ENABLE IT
00860 RET ; ALL DONE

```

## XFER\_2

## XFER\_3

```

39000 > 33 > ld hl,NN
39001 > 84 > <41300>
39002 > 161
39003 > 17 > ld de,NN
39004 > 84 > <41300>
39005 > 161
39006 > 1 > ld bc,NN
39007 > 0 > <24064>
39008 > 94
39009 > 62 > ld a,N
39010 > 1 > <1>
39011 > 211 > out (N),a
39012 > 244 > <244>
39013 > 26 > ld a,(de)
39014 > 8 > ex af,af'
39015 > 62 > ld a,N
39016 > 225 > <225>
39017 > 211 > out (N),a
39018 > 244 > <244>
39019 > 126 > ld a,(hl)
39020 > 8 > ex af,af'
39021 > 119 > ld (hl),a
39022 > 62 > ld a,N
39023 > 1 > <1>
39024 > 211 > out (N),a
39025 > 244 > <244>
39026 > 8 > ex af,af'
39027 > 18 > ld (de),a
39028 > 8 > ex af,af'
39029 > 19 > inc de
39030 > 35 > inc hl
39031 > 11 > dec bc
39032 > 120 > ld a,b
39033 > 177 > or c
39034 > 32 > jr nz,DIS
39035 > 229 > <229>
39036 > 62 > ld a,N
39037 > 1 > <1>
39038 > 211 > out (N),a
39039 > 244 > <244>
39040 > 201 > ret

```

```

39000 > 33 > ld hl,NN
39001 > 84 > <41300>
39002 > 161
39003 > 17 > ld de,NN
39004 > 84 > <41300>
39005 > 161
39006 > 1 > ld bc,NN
39007 > 0 > <24064>
39008 > 94
39009 > 62 > ld a,N
39010 > 1 > <1>
39011 > 211 > out (N),a
39012 > 244 > <244>
39013 > 26 > ld a,(de)
39014 > 245 > push af
39015 > 62 > ld a,N
39016 > 225 > <225>
39017 > 211 > out (N),a
39018 > 244 > <244>
39019 > 241 > pop af
39020 > 182 > or (hl)
39021 > 119 > ld (hl),a
39022 > 245 > push af
39023 > 62 > ld a,N
39024 > 1 > <1>
39025 > 211 > out (N),a
39026 > 244 > <244>
39027 > 241 > pop af
39028 > 18 > ld (de),a
39029 > 19 > inc de
39030 > 35 > inc hl
39031 > 11 > dec bc
39032 > 120 > ld a,b
39033 > 177 > or c
39034 > 32 > jr nz,DIS
39035 > 229 > <229>
39036 > 62 > ld a,N
39037 > 1 > <1>
39038 > 211 > out (N),a
39039 > 244 > <244>
39040 > 201 > ret

```

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# AERCO FD-68 DISK SYSTEM

## AERCO MERGE FUNCTION

by Larry Zunk

Larry Zunk of Zunk Custom Electronics (4800 East Cedar Lane, Norman, Oklahoma 73071), shares a few routines for the AERCO FD-68 disk drive system. Larry has programmed a powerful software package for the FD-68 called "CADZ" (watch for review in upcoming issue, or write to the above address for further details).

This is a tip for all Aerco FD-68 users. The basic MERGE function has never been available, but a simulated merge can be accomplished.

Rule #1: line numbers must be consecutive. Rule #2: get rid of all variables. Rule #3: is make sure there is enough room for both listings.

It works like this. In the immediate mode, type:  
CAT "first program.BAS",  
CLEAR 65535

POKE 23635,PEAK 23627 (POKE prog,vars)  
POKE 23636,PEAK 23628  
CAT "second program.BAS",  
(NOTE: Execution will stop here, and all you will see is the second listing.) Then also in the immediate mode, type:  
POKE 23635,86  
POKE 23636,104 (POKE prog,26710)  
LIST

## SUPER DETAILED DISK DIRECTORY

by Larry Zunk

The following program listings are for the AERCO FD-68 Disk Drive System. I must give credit to Mowgli Assor for his user tips in the SEP/OCT '87 issue of TDM. His machine code routines are the heart of these programs.

Listing 1 is a 32 column detailed disk directory. Listing 2 is a 64 column detailed directory for use with the Advanced Video Modes software by BEAVER COMPUTER PRODUCTS. Either version can be run in BASIC or compiled with the TIMACHINE compiler by NOVELSOFT.

The directory gives file name, type, length, location, auto start line numbers, length of variables, active chunks, and tracks allocated for each file. Although the information is the same, I prefer the 64 column version because everything fits on one line and it gives a much cleaner screen display.

My system is double-sided double-density, so some changes to the machine code in the data statement may be required for other systems. The disk directory is on track 0 sectors 2 and 3. The code sets the start of the buffer at E290h (58000 decimal) and reads track 0 sector 2, then increments the buffer address held in the HL register by 512 bytes. Then it sets the B register to 3 and reads sector 3. The AERCO user manual states that a single-density system has 256 bytes per sector and a double-density system has 512 bytes per sector (I assume that a quad-density system would have 1024 bytes per sector). This is what will need to be changed for systems other than DD/DD.

### LISTING 1

```
10 REM !USR 50000
20 REM !INT +LEN, LNLOC, VAR, BUF
,TYP, LOC, F, E
30 REM !LEN P$=<27
40 REM !LIST
50 REM !OPEN #
60 FOR F=59967 TO 59999: READ
E: POKE F, E: NEXT F: RANDOMIZE U
SR 59967
70 DATA INT 52,3,211,244,205,6
8,53,1,2,0,33,144,226,205,86,53,
1,3,0,33,144,228,205,86,53,205,1
30,53,52,1,211,244,201
80 LET BUF=58032
90 LET P$="BASDATCHRBINSRROL
ROBUTVAR"
100 CLS : PRINT INVERSE 1;" FI
LE LINE# VAR# NA
ME TYPE BYTES LOC CHUNK"; I
NVERSE 0; AT 0,21; OVER 1;"
_____, AT 2,0;
```

```
110 LET LOC=BUF: LET TYP=PEEK L
OC+3+1: LET LOC=LOC+1: LET E=LOC
+10
120 IF PEEK LOC<>0 AND LOC<E TH
EN PRINT CHR$ PEEK LOC;: LET LOC
=LOC+1: GO TO 120
130 LET LOC=E
140 GO SUB 300: LET LEN=E
150 GO SUB 300: LET LNLOC=E
160 GO SUB 300: LET VAR=E
170 IF TYP=13 THEN LET LEN=6912
180 PRINT TAB 10,". "; P$(TYP TO
TYP+2); TAB 15; LEN; TAB 21;
190 IF TYP=1 AND LNLOC<10000 TH
EN PRINT "1"; LNLOC; TAB 27; LEN-VA
R
200 IF TYP=10 THEN PRINT LNLOC;
TAB 27; INT (VAR/256)-2,
210 IF TYP=13 THEN PRINT 16384;
220 PRINT TAB 0;" ";
230 IF PEEK LOC<>0 THEN PRINT P
EEK LOC;" ";: LET LOC=LOC+1: GO
TO 230
240 POKE 23689, PEEK 23689+1: PR
INT OVER 1;" "
```

```
250 LET BUF=BUF+32
260 PRINT TAB 0;
270 IF PEEK 23689=2 THEN PRINT
#1; AT 1,0; INVERSE 1;" "; INVERSE
0: PAUSE 0: GO TO 100
280 IF LOC>58992 THEN STOP
290 GO TO 110
300 LET E=PEEK LOC+256*PEEK (LO
C+1): LET LOC=LOC+2: RETURN
310 REM ! CLOSE #
9999 ERASE "32COLDIR.BAS", MOVE
"32COLDIR.BAS",
```

### LISTING 2

```
10 REM !USR 50000
20 REM !INT +LOOP, LNLOC, VAR# , L
EN, LOC, B( ), N, F
30 REM !LEN P$=<27
40 REM !LIST
50 REM !OPEN #
```

Listing Continued Next Page

```

55 DATA INT 62,3,211,244,205,6
6 53,1,2,0,33,144,226,205,66,53,
1,3,0,33,144,226,205,66,53,205,1
30 53,62,1,211,244,201
56 FOR F=59967 TO 59999: READ
N POKE F,N: NEXT F: RANDOMIZE U
SR 59967
60 RANDOMIZE USR 61450: POKE 2
3578,21: PRINT #4;CHR$ 3+CHR$ 62
;CHR$ 0
70 LET LOOP=15: LET LOC=58031
DIM B(25)
80 LET P$="BASDATCHRBINSCRAROL
ROBUTVAR"
90 PRINT AT 0,0: INVERSE 1;" F
ile Name Typ Bytes+Vars Line:Ad
dr.Chunks:Tracks*****"
INVERSE 0
100 FOR F=1 TO LOOP
110 FOR N=1 TO 25: LET B(N)=PEE
K (LOC+N): NEXT N
120 FOR N=2 TO 11: IF B(N)>31 T
HEN PRINT AT F,N-2,CHR$ B(N),
130 NEXT N: LET VARS=B(1)*3+1
PRINT TAB 10,".":P$(VARS TO VARS
+2),TAB 15:
140 LET LEN=B(12)+256*B(13)

```

```

150 LET LNLOC=B(14)+256*B(15)
160 LET VARS=B(16)+256*B(17)
170 IF B(1)=0 THEN PRINT VARS:T
AB 20,"+";LEN-VARS:TAB 27,(LNLOC
AND LNLOC\10000);
180 IF B(1)=3 OR B(1)=8 THEN PR
INT LEN,TAB 32;LNLOC:TAB 38: IF
B(1)=3 THEN PRINT B(17)-2;
190 IF B(1)=4 THEN PRINT 6912:T
AB 32,16384;
200 PRINT TAB 44: FOR N=18 TO
25: IF B(N)>0 THEN PRINT (B(N)-(
87 AND B(N)>99));" ";
210 NEXT N
220 LET LOC=LOC+32
230 NEXT F
240 PRINT " INVERSE 1;" HIT
[ENTER] OR [FIRE BUTTON] TO
CONTINUE " INVERSE 0
250 IF INKEY$="" AND STICK (2,1
)=0 THEN GO TO 250
260 PRINT CHR$ 0; IF LOOP=15 T
HEN PRINT CHR$ 3+CHR$ 0;CHR$ 0
POKE 23578,6: STOP
270 LET LOOP=15: GO TO 90
280 REM ! CLOSE #
9999 OUT 244,1: ERASE "newdir.ba
s": MOVE "newdir.bas",

```

## SYNX

by Jack Dohany

SYNX is a 46-byte relocatable MC routine for AERCO disk drive system users. It is given into the "public domain". SYNX is short for "Syntax Checker Switch". This routine allows you to turn off the BASIC syntax checker when writing or editing BASIC lines...and to turn it back on. Syntax checking during program execution remains in effect.

Why? Perhaps you may want to write a BASIC program that can be used on a non-AERCO disk system (perhaps for ALL disk systems). You may want to write a line like this.

```
500 SAVE "TEST": REM for Zebra disk
```

Well, you can't write it because it will fail syntax checking. But with the syntax checker turned off, you can write it.

SYNX works by changing some locations in the BASIC operating system...normally in ROM, but in RAM with AERCO disk. A more detailed explanation is beyond the scope of this article.

Assuming you have the code on disk or tape as .BIN or CODE file, it can be loaded wherever there's no conflict with other software. Let us say you want to load it at Loc 64000: CAT "SYNX.bin",64000 or LOAD "SYNX" CODE 64000 will do it.

To SAVE the code: MOVE "SYNX.bin",64000,46 or SAVE "SYNX" CODE 64000,46

To use SYNX (assuming the code is at 64000): RANDOMIZE USER 64000 turns the syntax checker OFF. RANDOMIZE USER 64002 turns the syntax checker back ON.

Here is the SYNX code as a decimal listing, ready to be POKEd into memory however you wish:

64000	24	64020	24	64040	0
64001	27	64021	221	64041	243
64002	24	64022	197	64042	237
64003	18	64023	225	64043	176
64004	0	64024	1	64044	251
64005	0	64025	11	64045	201
64006	0	64026	0		
64007	253	64027	24		
64008	54	64028	5		
64009	0	64029	197		
64010	255	64030	255		
64011	0	64031	1		
64012	0	64032	4		
64013	205	64033	0		
64014	13	64034	9		
64015	13	64035	17		
64016	253	64036	76		
64017	54	64037	14		
64018	0	64038	1		
64019	255	64039	9		

Of course, if you get a single number wrong, the computer is likely to crash when you attempt to use SYNX. So it is a good idea to SAVE before you test it out.

## TIMACHINE ON AERCO DISK

by Carl Green

Here is a hint for putting TIMACHINE (Novelsoft) on the AERCO disk drive system. I found the FD-68 does not like:

- 1) equations
- 2) VAL "\_\_\_"
- 3) more than one period (.)
- 4) scientific notations (eg: 6e4)

in the CAT and MOVE statements. Try the following for TIMACHINE:

- 1) LOAD the whole program from tape.
- 2) Move the cursor to the right of the quotation marks
- 3) DELETE the quotation marks.
- 4) Press STOP once, then ENTER twice.
- 5) Change line 8070 to read:

```

8070 PRINT AT 19,0: MOVE "TSTIME
.BAS",9997: MOVE "TSTMLGO.BIN",6
0614,4922: MOVE "TSSETUP.BIN",60
000,83: MOVE "TSTIME2.BIN",26688
,11458

```

- 6) Change line 9997 to read:

```

9997 CLEAR 60613: INK 6: PAPER E
: BORDER 6: CLS: PRINT AT 19,0:
CAT "TSTMLGO.BIN",: RANDOMIZE U
SR 60614: INK 6: PRINT AT 19,0:
CAT "TSSETUP.BIN",: RANDOMIZE 11
458: LET X=USR 60000: PRINT AT 1
19,0: INK 6: CAT "TSTIME2.BIN",:
INK 0: GO TO 8000

```

- 7) OUT 244,1
  - 8) GOTO 8000
  - 9) Put formatted disk in.
  - 10) At the "BACK UP?" option, press "Y".
- TIMACHINE should now be on disk with the backup option operational.

# LARKEN 2068 DISK DRIVE SYSTEM

## CASSETTE TO LARKEN DISK

by Gaylen W. Bench

From the time I first bought my Timex Sinclair 1000 for a close-out price of \$29.95 (around 1982), I have always dreamed of the day when I could have a "complete" computer system.

I moved one step closer with the purchase of a used TS2068 in November of 1986. But I was still stuck with using cassette tapes.

Next I moved up to A&J Microdrives (for my TS2068). It was so much faster and easier to use. Over the next few weeks I spent a lot of time converting all of my cassette software to the A&J. I was happy with the A&J for almost six months...maybe even a little longer.

Then one day I was over at a friend's home and saw how nice his computer worked with a disk drive system. Now that would really be something to have a disk system for my hard working Timex Sinclair. But, it was just too expensive to add one to my computer system.

Then along came Mr. Larry Kenny of LARKEN ELECTRONICS, and his floppy disk drive system for the TS2068. The cost was low enough to give it a try. Now about a year later, my present system includes the used 2068, a Larken disk drive system, a dual Amdisk Amdisk III, one Quad 5 1/4" drive, an RX-80 Epson printer, an Aerco printer interface, a TS2040 printer, a 2050 modem, a green screen monitor, and lots of software. If I had the money that I have spent on this system over the last six years, I could buy a "basic" PC compatible, with NO software or peripheral hardware. I'm going to stick with my Sinclair.

Now that you know a little of the history of my hardware system, maybe I can help you convert cassette (or A&J Micro Drive cartridge) software to the Larken Disk Drive system. During this last year, I have, with the help and advice of some fellow Sinclair users, converted the following software to the Larken

Tasword II, Pro/File 2068, Pro/File +5, VuFile, VuCalc, Timemachine, Pixel Print, Zeus, Loader V, Jet Set Willy, Voice Chess, Greeting Card Designer, Banner Designer, Personal Accountant, Kruncher, programs on the original tape supplied with the 2068, and many other pieces of software taken from a variety of sources.

Changing all of this software to the Larken DOS (Disk Operating System) has one thing in common: the changes made in each program is a modification of the BASIC save and load commands, to save the program, to load and save code, to load and save data strings, to load and save screen strings. Refer to the Larken operations manual for instructions on how the "RANDOMIZE USR 100" is used before each load or save command in your BASIC program. The following listing is an example of how these changes were made in TASWORD II (2068 word processor):

```
15 RANDOMIZE USR 100: OPEN #4,
'dd', POKE VAL "23609", VAL "2",
CLEAR VAL "33279": GO SUB VAL "4
000", BORDER VAL "2", PAPER VAL
"4", INK VAL "9": PRINT #4: LOAD
"TW,Ct"CODE: CLS: LET a=USR V
AL "59081": GO TO VAL "10"
25 GO SUB VAL "4000": PRINT AT
VAL "2", VAL "0": "print text fil
e", TAB VAL "31", "p"
30 PRINT: PRINT "save text fi
le", TAB VAL "31", "s"
35 PRINT: PRINT "load text fi
le", TAB VAL "31", "j"
40 PRINT: PRINT "merge text f
ile", TAB VAL "31", "m"
45 PRINT: PRINT "return to te
xt file", TAB VAL "31", "y"
50 PRINT: PRINT "define graph
ics/prnter", TAB VAL "31", "g"
```

```
50 PRINT: PRINT "save tasword
", TAB VAL "31", "t"
55 PRINT: PRINT "into Basic",
TAB VAL "31", "b"
60 PRINT: PRINT "DIRECTORY"; T
AB VAL "31", "d"
70 PRINT AT VAL "20", VAL "0", "
Press key"
110 IF b=VAL "115" THEN LET i=V
AL "6"
120 IF b=VAL "106" THEN LET i=V
AL "8"
125 IF b=VAL "116" THEN LET i=V
AL "16"
130 IF b=VAL "112" THEN LET i=V
AL "4"
140 IF b=VAL "121" THEN LET i=V
AL "12"
150 IF b=VAL "109" THEN LET i=V
AL "10"
160 IF b=VAL "103" THEN LET i=V
AL "14"
170 IF b=VAL "98" THEN LET i=U
AL "18"
175 IF b=VAL "100" THEN GO TO U
AL "9970"
700 CLS: LET i=VAL "8": GO SUB
VAL "800": GO SUB VAL "9900": L
ET a$="TW": PRINT #4: SAVE a$+"
Bt" LINE VAL "15"
710 PRINT #4: SAVE a$+"Ct" CODE
VAL "54784", VAL "10751": GO TO
VAL "25"
1030 LET i=VAL "12": GO SUB VAL
"800": GO SUB VAL "9900": PRINT
#4: SAVE a$+"Ct" CODE b,a: CLS
2030 LET b=FN P(VAL "62215") GO
SUB VAL "9930": PRINT #4: LOAD
a$+"Ct" CODE (a+b), ((FN P(VAL "6
221") + VAL "22") * VAL "64" - a) GO
TO VAL "10"
9900 INPUT "Drive 0, 1, 2, 3 "
, Dr: PRINT #4: GO TO Dr: RETRN
9970 CLS: GO SUB VAL "9900": PR
INT #4: CAT "": PAUSE 0: CLS
GO TO VAL "25"
```

Line 15 sets up the PRINT #4 command that will be used before each save and load command in the program. Line 60 adds a disk directory choice to the tasword menu. Line 175 is the IF..THEN statement used by the menu to call Line 9970. Line 9970 calls the GO SUB Line 9900 which gives you a choice of which drive you want and then returns to do the catalog of that chosen drive. After the directory is done, the program will return to the main menu. Please note that the drive selection GO SUB Line 9900 is also called by both the load and save lines of the program. Lines 700-710 are the save lines that will save Tasword II to disk. Line 1030 is the save line that will save all files (letters or documents) to disk. Line 2030 is the load line that will load your chosen file from the disk to Tasword.

I know that this is a brief description of how these lines are changed. But there is one area of concern that has to be dealt with in making these changes. That area is the memory spaces for the basic program. You will note in Line 15, that RAMTOP is lowered to 33279, and then the Tasword code is loaded above that. The basic program cannot be written above that address. If you change that address...well, that's another complete article.

There are a number of ways that the original basic program can be changed to free up memory space to allow for these changes. If you are going to dedicate the program to disk use only, you can go in and DELETE the cassette VERIFY routines. The Larken system uses the VERIFY command as a "disk check" command (refer to the Larken manual for further details). You can also change or eliminate any prompts that are displayed on the screen concerning the loading, saving, or verifying of cassette tapes.



One more way to free up program memory space is the use of the KRUNCHER program (written by Syd Wyncoop and available from RMG Enterprises). KRUNCHER will "modify" the basic listing. It places all numbers found in the listing inside VAL "" statements, and replaces the number 0 with NOT PI, 1 with SGN PI, and 3 with INT PI. These tokens have the same value as the number. There is one problem in using the KRUNCHER program: it does not change negative numbers correctly. A -250 will be changed to VAL "-250", which causes a syntax error in the basic program. The way to correct this is, before you "krunch" the program, list it out and put any negative number inside brackets (-250 will be -(250)). The KRUNCHER program will now convert this number correctly.

There are some other problems encountered when converting cassette software to disk. One of the first ones you may come across, is the program (or file) name. Cassette allows a name to be ten characters long. Larken allows up to six characters plus an "extension". You can see how the program (file) name and extension are used, by looking at the load and save lines of the Tasword listing example (please refer to the Larken manual for rules concerning the use of extensions). Some basic programs include a "test statement", testing for the cassette ten character name length. These statements will have to be changed to conform to the Larken file name length.

I hope that I have been able to help some of you with the change from cassette to Larken disk. If any of you have suggestions on how these changes can be made easier than I have listed, please feel free

to contact me. I'm Gaylen W. Bench, and my address is: 900 N.W. Mawcrest Dr. #110, Gresham, Oregon 97030. You can also contact me via CompuServe (ID# 73720,755), or on the RMG BBS (503-656-8072; settings 8/1/N). I will gladly pass any updated information to TDM readers in a future article.

The information provided in this article is a long way from being complete on how to convert every program to disk. If any of you would like assistance in making these changes, please contact me, and we will work out some arrangement on how to get the job done.

One more important find. If any of you have attempted to put a choice in your basic program to switch between the Timex 2040 printer and a full-size printer, you will run into a problem using the Larken system. For some reason the Larken system over-writes the 2068's print buffer. You can find out if you have this problem by doing an LLIST to the 2040 printer. If the first thing printed is garbage, then you have the problem. I tried for about a year to find a solution. Whenever I would use the PRO/FILE +5 program, I could not switch back to the 2040 printer after using the full-size printer...the program would "crash". The correction to this problem is so simple! When you change back to the 2040, the first thing you need to do is a simple "LPRINT". This clears the 2068 print buffer and now you can print with the 2040 without any trouble.

## PASCAL DISK HANDLER FOR THE LARKEN

Article by David Solly  
Programs by David Solly and Larry Kenny

Access to the Larken Disk Drive System from within a compiled HiSoft(TM) Pascal program is now possible thanks to the procedures developed by David Solly and Larry Kenny. This article demonstrates how to install these procedures and gives a practical demonstration on how they may be used within a simple directory program. The procedures described in this article are valid for both the Timex Sinclair 2068 and the ZX Spectrum versions of HiSoft Pascal.

I have owned HiSoft Pascal, (henceforth Pascal), for the Timex Sinclair 2068 and the ZX Spectrum for a number of years now but the drawback with Pascal, as it is implemented on Sinclair computers, has been that there was no way to access a DOS from within a compiled program. It seemed ridiculous to put the effort into creating programs which ran like machine code once the source code was debugged, compiled and transferred to disk only to be forced to go back to a plodding tape operating system, (henceforth TOS), when I needed to save or enter data from within the compiled program. Finally I sat down and did some serious study of the problem, some head scratching, some question asking (especially of Larry Kenny, who is the creator of the Larken DOS, and Ken Schieban) and some experimentation. The result of this is the creation of the Pascal disk handler described below.

The needs of LKDOS are the same as for the TOS. You are required to provide the name of your program, the starting address of the program and the length of the program. This is exactly what happens when you type within Basic:

SAVE "Myprogram" CODE start, length.

Pascal also passes the same information to the TOS when it saves out a variable through the use of the procedure:

TOUT ('Myprogram', ADDR (the name of the variable being saved), SIZE (the name of the variable being saved));

The crux of the problem is that, although both languages generate identical information, LKDOS can extract it only from within the Basic environment. Therefore, additional programming is need in order to transfer the save or load parameters to LKDOS from within the Pascal environment.

The first steps towards transferring the required information from Pascal to LKDOS are to store the name, the start address, and the length of the variable to be saved or loaded in a safe area of the RAM. This is a simple matter thanks to the very versatile POKE() function in Pascal. Unlike the POKE command available in Basic, this Pascal function can DOKE a number or POKE the contents of a whole character array starting at a given address. The first fifteen bytes of the printer buffer proved to be the safest area to which all the transfers can be achieved with the following lines:

POKE (23300, 'Myprogram');

POKE (23311, ADDR (name of variable));

and

POKE (23313, SIZE (name of variable));

You can see these lines in a modified form in the demonstration program within the procedures GETNAME, DISKSAVE and DISKLOAD.

Upon completion of these steps the next step is to copy the information from its storage place in the RAM to the appropriate routines in the LKDOS. Again to HiSoft includes within their implementation of Pascal the procedure INLINE() which allows us to embed Z80 machine code within a Pascal procedure to accomplish our ends.

The following is a disassembly of the machine code used in the procedure DOUT

```

00010 NAME      EQU 23300
00020 PROGNM    EQU 8226
00030 TEMP4     EQU 8243
00040 TEMP2     EQU 8241
00050 NMIF      EQU 8194
00060 ADDR      EQU 23311
00070 SIZE      EQU 23313
00080 SV1       EQU 0204
00090 SV2       EQU 0207
00100           ORG 40000
00110           DI                ; Disable interrupt
00120           CALL 98            ; Turn on LKDOS cartridge
00130           LD HL,NAME         ; Transfer file name
00140           LD DE,PROGNM       ; to program
00150           LD BC,09
00160 MOVE      LD A,(HL)         ; Loop to catch any
00170           CP 0                ; occurrence of CHR# 0
00180           JR NZ,NZERO
00190           LD (HL),32        ; & replace with a space
00200 NZERO      LD I
00210           LD A,B
00220           OR C
00230           JR NZ,MOVE
00240           LD A,11
00250           LD (NMIF),A
00260           CALL SV1           ; Save name
00270           LD HL,(ADDR)        ; Retrieve start address
00280           LD (TEMP4),HL       ; Set start address
00290           LD HL,(SIZE)       ; Retrieve length of save
00300           LD (TEMP2),HL      ; Set length of save
00310           CALL SV2           ; Second save data
00320           LD A,(100)         ; Exit cartridge
00330           EI                ; Enable interrupt

```

(Program provided by Larry Kenny of Larken Electronics, #2 Navan, Ontario, Canada K4B 1H9, Tel: (613)-835-2680)  
(Listing made using Zeus Assembler)

The procedure DIN contains the same code except that SV1 and SV2 are replaced with LD1 EQU 198 and LD2 EQU 201. The MOVE loop insures that the file name is padded out with the correct number of spaces so that it totals nine characters and spaces otherwise the file name may be corrupted and fail to reload.

The following listing demonstrates how all the procedures described above are used within a complete Pascal program. The object of the program is to create a simple telephone directory which will allow you to store ten names and numbers, read the information stored in the directory, and read and write the information stored in the directory to disk using the Larken LKDOS. There is also a summation of this article contained in the procedure SONGANDBDANCE.

#### Pascal source code listing

```

10 {PROGRAM BY:          }
20 {DAVID SOLLV         }
30 {1402-1545 ALTA VISTA DRIVE}
40 {OTTAWA, ONTARIO    }
50 {CANADA K1G 3P4     }
60 {TEL: (613)-731-2120 }
70
80
90 {THIS PROGRAM IS FOR  }
100 {DEMONSTRATING HOW THE }
110 {LARKEN DISK DRIVE MAY BE }
120 {ACCESSED FOR STORING AND }
130 {RETRIEVING DATA WITHIN A }
140 {HISOFT(TM) PASCAL PROGRAM.}
150 {THE PROCEDURES DESCRIBED }
160 {IN THIS PROGRAM ARE VALID }
170 {FOR BOTH THE ZX SPECTRUM }
180 {AND THE TIMEX SINCLAIR }
190 {2068 VERSIONS OF HISOFT }
200 {PASCAL.             }

```

```

210
220
230 PROGRAM LARKENDEMO;
240
250 CONST
260   LENGTH = 10;
270   PN = 23300; {ADDRESS WHERE THE NAME FOR THE SAVE/LOAD}
280               {ROUTINES IS STORED}
290   PB = 23311; {CONTAINS THE ADDRESS WHERE THE DATA BEGINS}
300   PS = 23313; {CONTAINS THE NUMBER OF BYTES USED BY THE DATA}
310   CAPSLOCK = 23658; {ADDRESS OF THE CAP SHIFT LOCK CONTROL}
320   ON = 8; {SWITCHES CAPSLOCK ON}
330   OFF = 0; {SWITCHES CAPSLOCK OFF}
340
350 TYPE
360   ENTRY = RECORD
370     NAME : ARRAY [1..10] OF CHAR;
380     NUMBER : ARRAY [1..10] OF CHAR;
390   END;
400
410 VAR
420   DIRECTORY : ARRAY [1..LENGTH] OF ENTRY;
430   I : INTEGER;
440   FINISHED : BOOLEAN;
450   ANS : CHAR;
460
470
480
490
500
510
520 PROCEDURE DOUT; {INVOKES LKDOS WRITE}
530 BEGIN
540   INLINE (#F3, #CD, #62, #00, #21, #04, #5B, #11,
550           #22, #20, #01, #09, #00, #7E, #FE, #00,
560           #20, #02, #36, #20, #ED, #A0, #78, #B1,
570           #20, #F3, #3E, #0B, #32, #02, #20, #CD,
580           #CC, #00, #2A, #0F, #5B, #22, #33, #20,
590           #2A, #11, #5B, #22, #31, #20, #CD, #CF,
600           #00, #3A, #64, #00, #FB);
610 END;
620
630
640 PROCEDURE DIN; {INVOKES LKDOS READ}
650 BEGIN
660   INLINE (#F3, #CD, #62, #00, #21, #04, #5B, #11,
670           #22, #20, #01, #09, #00, #7E, #FE, #00,
680           #20, #02, #36, #20, #ED, #A0, #78, #B1,
690           #20, #F3, #3E, #0B, #32, #02, #20, #CD,
700           #C6, #00, #2A, #0F, #5B, #22, #33, #20,
710           #2A, #11, #5B, #22, #31, #20, #CD, #C9,
720           #00, #3A, #64, #00, #FB);
730 END;
740
750
760 PROCEDURE GETNAME;
770 VAR
780   PROGNM : ARRAY [1..9] OF CHAR;
790
800 BEGIN
810   WRITELN;
820   POKE (CAPSLOCK, OFF);
830   WRITELN ('NAME FOR DISK OPERATION? ');
840   WRITELN;
850   WRITE ('9 CHARACTERS MAXIMUM: ');
860   READLN;
870   READLN (PROGNM);
880   POKE (PN, PROGNM); {STORES THE NAME IN RAM}
890 END;
900
910
920 PROCEDURE DISKSAVE;
930 BEGIN
940   PAGE;
950   WRITELN;
960   WRITELN ('LARKEN DISK SAVE ROUTINE');
970   WRITELN;
980   GETNAME;
990   POKE (PB, ADDR (DIRECTORY)); {START ADDRESS FROM WHERE THE}
1000                                {DATA IS TO BE SAVED}
1010   POKE (PS, SIZE (DIRECTORY)); {NUMBER OF DATA BYTES TO SAVE}
1020   DOUT;
1030   WRITELN ('SAVED!');
1040   FOR I := 1 TO 100 DO {PAUSE LOOP}
1050     END;
1060   IOL4

```

```

1070
1080 PROCEDURE DISKLOAD;
1090 BEGIN
1100   PAGE;
1110   WRITELN;
1120   WRITELN ('LARKEN DISK LOAD ROUTINE');
1130   WRITELN;
1140   GETNAME;
1150   POKE (PB, ADDR (DIRECTORY)); {START ADDRESS AT WHICH THE
1160                                   {DATA IS TO BE LOADED}
1170   POKE (PS, SIZE (DIRECTORY)); {NUMBER OF DATA BYTES TO LOAD}
1180   DIN;
1190   WRITELN ('LOADED!');
1200   FOR I := 1 TO 100 DO (PAUSE LOOP)
1210 END;
1220
1230 PROCEDURE FILLDIRECTORY;
1240 BEGIN
1250   PAGE;
1260   POKE (CAPSLOCK, OFF);
1270   FOR I := 1 TO LENGTH DO
1280     BEGIN
1290       WITH DIRECTORY [I] DO
1300         BEGIN
1310           WRITELN ('ENTRY NO. ', I, ' OF ', LENGTH);
1320           WRITELN;
1330           WRITE ('NAME PLEASE (10 CHARS) ');
1340           READLN;
1350           READ (NAME);
1360           WRITE ('NUMBER PLEASE (10 CHARS) ');
1370           READLN;
1380           READ (NUMBER);
1390         END
1400       END;
1410   END;
1420   WRITELN ('DIRECTORY FULL ');
1430   WRITELN;
1440   WRITELN ('HIT ANY KEY TO CONTINUE');
1450   READLN
1460 END;
1470
1480
1490 PROCEDURE READDIRECTORY;
1500 BEGIN
1510   PAGE;
1520   POKE (CAPSLOCK, OFF);
1530   FOR I := 1 TO LENGTH DO
1540     BEGIN
1550       WITH DIRECTORY [I] DO
1560         BEGIN
1570           WRITELN (NAME, ' ', NUMBER);
1580           WRITELN;
1590         END
1600       END;
1610   WRITELN ('END OF DIRECTORY');
1620   WRITELN ('HIT ANY KEY TO CONTINUE');
1630   READLN
1640 END;
1650
1660 PROCEDURE SONGANDDANCE;
1670 BEGIN
1680   PAGE;
1690   WRITELN ('Larken Disk Access Routine');
1700   WRITELN ('for');
1710   WRITELN ('HiSoft(TM) Pascal');
1720   WRITELN ('for the');
1730   WRITELN ('ZX Spectrum');
1740   WRITELN ('and the');
1750   WRITELN ('Timex Sinclair 2068');
1760   WRITELN;
1770   WRITELN ('by');
1780   WRITELN ('David Solly');
1790   WRITELN ('and');
1800   WRITELN ('Larry Kenny');
1810   WRITELN;
1820   WRITELN;
1830   WRITELN ('Hit any key to continue');
1840   READLN;
1850   PAGE;
1860   WRITELN ('Many ZX Spectrum and TS 2068');
1870   WRITELN ('programmers have long wanted to');
1880   WRITELN ('do serious programing in other');
1890   WRITELN ('languages than the resident');
1900   WRITELN ('Sinclair Basic. Although such');
1910   WRITELN ('languages as Forth, Logo, C,');
1920   WRITELN ('Prolog and Pascal have long been');
1930   WRITELN ('available to Sinclair users one');
1940   WRITELN ('of the main drawbacks for');

```

```

1950   WRITELN ('serious programing in these');
1960   WRITELN ('languages has been the lack of');
1970   WRITELN ('disk I/O routines. This program');
1980   WRITELN ('will demonstrate how the Larken');
1990   WRITELN ('disk drive system may be');
2000   WRITELN ('accessed for storing and ');
2010   WRITELN ('retrieving data within a');
2020   WRITELN ('HiSoft(TM) Pascal program. The');
2030   WRITELN ('procedures described in this ');
2040   WRITELN;
2050   WRITELN ('Hit any key to continue');
2060   READLN;
2070   PAGE;
2080   WRITELN ('program are valid for both the');
2090   WRITELN ('ZX Spectrum and the Timex');
2100   WRITELN ('Sinclair 2068');
2110   WRITELN;
2120   WRITELN ('The two disk drive procedures');
2130   WRITELN ('are found in the procedures DIN,');
2140   WRITELN ('and DOUT. A third procedure,');
2150   WRITELN ('called GETNAME, supplies the');
2160   WRITELN ('above procedures with a name for');
2170   WRITELN ('storing or retrieving from the');
2180   WRITELN ('disk. All these procedures work');
2190   WRITELN ('in conjunction with the resident');
2200   WRITELN ('procedures ADDR(), SIZE(), and');
2210   WRITELN ('POKE()');
2220   WRITELN;
2230   WRITELN ('The authors hope that these');
2240   WRITELN ('procedures will stimulate Pascal');
2250   WRITELN ('programing for the ZX Spectrum');
2260   WRITELN;
2270   WRITELN ('Hit any key to continue');
2280   READLN;
2290   PAGE;
2300   WRITELN ('and the Timex Sinclair 2068 and');
2310   WRITELN ('encourage other Sinclairests to');
2320   WRITELN ('write disk routines for the');
2330   WRITELN ('other languages mentioned');
2340   WRITELN ('above.');
```

## For the **TIMEX 2068** and **QUINTE 20** Color Copy **NEW for your 2068!!**

### COPY A SCREEN\* IN COLOR? YES!

Now a T/S 2068 artist can copy to paper his/her favorite screen\$ ..... **IN FULL COLOR!!** All eight Timex paper & ink colors are accurately reproduced for a full 24 line X 32 column graphics screen dup. The user friendly software provides for two copy sizes in color or in black & white.

**HARDWARE REQUIREMENTS?** - An OKIMATE 20 printer w/ COMMODORE PLUG 'n PRINT CARTRIDGE are interfaced to a 2068 via a simple COMMODORE serial port emulator circuit; (The same circuit also interfaces a 2068 to a COMMODORE 1520 4-color printer/plotter.) The I/F hardware sells for \$14.95 (bareboard only), \$20.95 (complete kit), and \$30.95 (assembled & tested) - all postpaid.

**OTHER SOFTWARE?** - The OKIMATE 20 is a many featured 80/136 col. printer, able to print in draft, NLQ, italics, reverse (white on black), underline, super/subscripts, six char. sizes, and do 7 or 24 pin color or b/w graphics. A "patch kit" software program allows CHSript versions 5/5.2 to print to the OKIMATE 20. A hi-res driver code block is also available for LPRINT/LLISTING to the OKIMATE 20 from BASIC. All software is priced at \$8.95 postpaid each and comes with complete user notes.

Send LSASE for additional information and order form to:

♦♦♦ John McMichael ♦♦♦  
 ♦♦♦ 1710 Palmer Drive ♦♦♦  
 ♦♦♦ Laramie, WY 82070 ♦♦♦

```

2350 WRITELN;
2360 WRITELN ('David Solly');
2370 WRITELN ('Larry Kenny');
2380 WRITELN;
2390 WRITELN;
2400 WRITELN ('Hit any key to continue');
2410 READLN
2420 END;
2430
2440
2450 BEGIN (BODY OF THE PROGRAM)
2460 REPEAT
2470 PAGE;
2480 POKE (CAPSLOCK, ON);
2490 FINISHED := FALSE;
2500 WRITELN;
2510 WRITELN;
2520 WRITELN ('MENU');
2530 WRITELN;
2540 WRITELN ('SELECT ONE OF THE FOLLOWING');
2550 WRITELN ('OPTIONS ');
2560 WRITELN;
2570 WRITELN;
2580 WRITELN ('1) READ THE INTRODUCTION');
2590 WRITELN ('2) CREATE DATA');
2600 WRITELN ('3) READ DATA');
2610 WRITELN ('4) SAVE DATA TO DISK');
2620 WRITELN ('5) LOAD DATA FROM DISK');
2630 WRITELN ('6) EXIT THE PROGRAM');
2640 WRITELN;
2650 WRITELN;
2660 WRITE ('MAKE YOUR SELECTION ');
2670 READLN;
2680 READ (ANS);
2690
2700
2710 CASE ANS OF
2720 '1' : SONGANDDANCE;
2730 '2' : FILLDIRECTORY;
2740 '3' : READDIRECTORY;
2750 '4' : DISKSAVE;
2760 '5' : DISKLOAD;
2770 '6' : FINISHED := TRUE
2780 END;
2790
2800

```

```

2810 UNTIL FINISHED = TRUE;
2820
2830
2840 {FINALE}
2850 PAGE;
2860 WRITELN;
2870 WRITELN;
2880 WRITELN ('END OF DEMONSTRATION');
2890 WRITELN;
2900 WRITELN
2910 END.

```

The Pascal disk handler described in this article and program works only within a compiled Pascal program and, regretfull, can not be used to save Pascal source code. The procedures DIN, DOUT, and GETNAME are completely modular. They may be copied directly from this program into the appropriate section of any Pascal program you care to write which requires access to LKDOS. The procedures DISKSAVE and DISKLOAD may also be used but remember to change the name within the parentheses of ADDR() and SIZE() to the name of the variable within your program that you wish to save or load. The ".C" extension required by data file saves within Basic when using LKDOS is not required by the Pascal disk handler, however, it may be good practice to use the extension ".P" to indicate that the data that has been saved is intended for a Pascal program rather than a Basic program. All the LKDOS error codes are operational and will stop your program without crashing providing that the compiled code is accessed through a Basic loader program, that a PRINT USR is used rather than RANDOMIZE USR and that there is at least one line of Basic after the USR call. Example:

```

10 REM TYPICAL COMPILED PASCAL PROGRAM LOADER
20 BORDER 0: PAPER 0: INK 7: CLS
30 PRINT #4: LOAD "MYPROG.C1" CODE 27000
40 CLS: PRINT USR 27000
50 STOP
9000 REM SAVE LOADER TO DISK
9010 PRINT #4: SAVE "LOADER.B1" LINE 1

```

On behalf of Larry and myself I hope that this Pascal disk handler will prove to be useful to all who wish to do serious programming in Pascal which requires disk access.

# ZEBRA/TIMEX FDD DISK SYSTEM

## MACHINE CODE TRACK READER

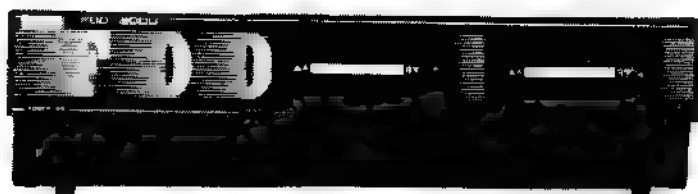
by Mike Finn

In order to write more advanced programs for the Zebra FDD disk drive system, we need to know more about it's operating system. To write disk utilities we need to be able to see exactly what is on disk without a basic program using exactly TOS (Timex Operating System) commands as intermediary. Since TOS is stored on the first four tracks of the disk and downloaded to controller RAM, we need disk reading and writing utilities to make any desired changes to TOS, or to develop utilities such as a program which would recover disk data after accidental erasure.

The following machine code program will read all the sectors of any given track on the disk and store the 4K bytes of disk track data in Home RAM at 7000 hex for access by a monitor disassembler machine code program. The track reader code resides at E000 to E050 hex. I have used both Zeus Monitor and HOT-Z AROS with it. In fact, I have used HOT-Z AROS in all 3 banks: home, dock, and exrom with 32K non-volatile memory board in the dock cartridge slot with this track reader program. The code can be readily modified to be used at some other location if you are using some other disassembler.

E000 00		Storage space for drive #
E001 00		Storage space for track #
E002 210070	LD HL, 7000	Beginning of home ram storage for disk track contents
E005 3A01E0	LD A, (E001)	
E008 57	LD D,A	D contains track #
E009 3A00E0	LD A, (E000)	
E00C 4F	LD C,A	C contains drive unit #
E00D FDE5	PUSH IY	Page in ZEBRA interface rom/ram
E00F FD210000	LD IY,0000	
E013 CD0800	CALL 0008	
E016 FDE1	POP IY	
E018 1E00	LD E,00	E will hold sector #
E01A 3E1B	LD A,1B	Disk command to read sector contained in E of track in D of drive in C
E01C 320021	LD (2100),A	Command buffer
E01F C5	PUSH BC	Save request parameters
E020 D5	PUSH DE	
E021 E5	PUSH HL	Save current home ram download address
E022 CD0806	CALL 0608	Calls command sending routine
E025 CD2606	CALL 0626	This routine controls for reply from disk
E028 3A0221	LD A, (2102)	This system variable holds





```

EO2B A7      AND A
EO2C 0600    LD B,00
EO2E 4F      LD C,A
EO2F 201C    JR NZ,E04D
EO31 E1      POP HL
EO32 110020  LD DE,2000
EO35 EB      EX DE,HL
EO36 010001  LD BC,0100
EO39 EDB0    LDIR
EO3B EB      EX DE,HL
EO3C D1      POP DE

EO3D 7B      LD A,E
EO3E C607    ADD A,07
EO40 E60F    AND OF
EO42 5F      LD E,A
EO43 C1      POP BC
EO44 20D4    JR NZ,E01A

EO46 010000  LD BC,0000

EO49 CD0306  CALL 0603
EO4C C9      RET

EO4D E1      POP HL
EO4E E1      POP HL
EO4F E1      POP HL
EO50 18F7    JR E049

```

Relative addressing is used as much as possible within the machine code. The only absolute address calls are to a jump table in Zebra ROM, as described in Appendix F of the user manual, so all versions of the FDD should run this code. The only lines that need to be changed to relocate this code for use with another monitor/disassembler are lines 3, 4, and 6. You will need to change the absolute addresses used in those lines to match your memory layout.

A basic program is used to load the code from disk, poke the track and driver parameters, load your favorite monitor, run the code, and enter the monitor program to view the disk data. In the basic program you must replace lines 30 to 38 and 140 to 148 with your own monitor/disassembler loads and calls. I use one of the following depending on my system configuration.

```

ZEUS monitor:
    30 LOAD * "ZEUSMON.COD"CODE
    140 IF BC=0 THEN PRINT USR 62137

HOT-Z AROS:
Home:
    30 LOAD * "HOT-Z2.5.COD"CODE
    140 IF BC=0 THEN RAND USR 32776

Dock:
    140 IF BC=0 THEN OUT 255,0: OUT 244,
    240: RAND USR 32776

Exrom:
    140 IF BC=0 THEN OUT 255,128: OUT 24
    4,240: RAND USR 32776

```

Mostly I keep HOT-Z in Exrom. There are several "bugs" in the FDD's initiation routines when dock bank cartridges are present. I avoid these conflicts by keeping HOT-Z AROS in exrom from 8000 to DFFF hex.

Once you enter the monitor you shouldn't need to return to basic. Parameters at E000 and E001 hex can be poked using utilities in the monitor program and both ZEUS and HOT-Z have code execution routines. For ZEUS, I use the DISASSEMBLE command to read code and the EDIT command to read data. The EDIT command is also used to change parameter values at E000 and

E001. I use the GOTO command to rerun the code at E002. For HOT-Z, the normal read mode can disassemble code and the display switch (SS-G) will read data. I can enter the edit mode (SS-A) to input new parameter values and use the run command (CSS-RUN) to rerun the track reader code. HOT-Z has an advantage over ZEUS for reading files containing basic programs. ZEUS won't display the characters corresponding to codes over 127.

For those whose monitors do not include an assembler, the following loader may be used to enter the code.

```

1 REM ZEBRA Disk Drive
  Track Reader Utility
  by Mike Finn
2 REM This utility requires a
  monitor/disassembler
  machine code program
3 REM Program allows for
  monitor code to occupy
  addresses from 8000
  to DFFF Hex or from
  E051 to FF57 hex
4 REM E000 to E050 is reserv-
  ed for track reader m/c
5 REM 7000 to 7FFF is reserv-
  ed for disk data
10 CLEAR 28671
20 LOAD * "TRACKRDR.COD"CODE
30 REM *****
32 REM
34 REM Replace this REM with
  a LOAD * instruction to
  load your favorite mon-
  itor disassembler from
  Disk
36 REM
38 REM *****
40 PRINT "TAB 5;" "DISK REVIEWIN
  G UTILITY"
50 INPUT "Source Drive (A TO D
  ) ";DS
60 LET D=CODE DS
70 IF D>=97 AND D<=100 THEN L
  ET D=D-32
80 LET D=D-65: IF D<0 OR D>3 T
  HEN GO TO 50
90 POKE 57344,D
100 INPUT "Track (0 to 39) ";T
110 IF T<0 OR T>39 THEN GO TO
  100
120 POKE 57345,T
130 LET BC=USR 57346
140 REM *****
142 REM
144 REM Replace this REM with
  IF BC=0 THEN RAND USR
  ( monitor address )
146 REM
148 REM *****
150 PRINT "ERROR ";BC;"! Please
  see user manual."

10 REM Machine code loader
15 RESTORE
20 FOR I= 57344 TO 57425
25 READ A: POKE I,A: NEXT I
30 DATA 000,000,033,000,112,05
8,001,224,087,058,000,224,079
35 DATA 253,229,253,033,000,00
0,205,008,000,253,225,030,000
40 DATA 062,027,050,000,033,19
7,213,229,205,008,006,205,038
45 DATA 006,058,002,033,167,00
6,000,079,032,028,225,017,000
50 DATA 032,235,001,000,001,23
7,176,235,209,123,198,007,230
55 DATA 015,095,193,032,212,00
1,000,000,205,003,006,201,225
60 DATA 225,225,024,247

```

# "S" AND "Q" KEYS WITH "CAT\*" COMMAND

by Mike Finn

After reading Ronald Havlen's FDD Express (Oct. '87) newsletter about the problem with stopping the scrolling on the CAT\* command with keys "S" and "Q", I began to experiment and I soon discovered that these keys will work occasionally. Here is a small program which shows that an even larger problem exists.

First, make sure you have a disk with a large enough directory to require screen scrolling. One fast way to do this is to run the following program:

```
10 FOR I = 1 TO 40
20 LET A$ = STR$ I
30 DIM* A$
40 NEXT I
```

Now delete that program and enter the following:

```
10 LET I = 0
20 CAT*
30 LET I = I + 1
40 GOTO 20
```

Run this program and while it is running, press and hold the "S" key. Be patient, as this may take a minute or so. Eventually, the scrolling will freeze and will remain this way until the "Q" key is pressed. Press the "Q" key and the screen will begin scrolling again. Immediately press CAPS SHIFT and BREAK. Enter as a direct command PRINT I. The first time I tried this it took 33 repetitions of the loop from lines 20 to 40 before the scrolling stopped. Other times it took as few as four loops.

This shows that the "S" and "Q" keys do work sometimes...the problem is why don't they work all of the time.

I've also noticed another problem which may be similar to the systems non-response to the "S" key. Let's clean up our disk's directory with the following program.

```
10 FOR I = 1 TO 40
20 LET A$ = STR$ I
30 ERASE A$
40 NEXT I
```

When you run this program, TOS (Timex Operating System) will ask you to confirm that you want to erase each directory entry. Answer "Y" each time and take notice of how long a wait there is between when you press "Y" and when TOS recognizes that you replied. The first six times I answered "Y", TOS recognized my input immediately, but the following two times, there was noticeable lag. On one occasion, I tapped the "Y" key several times before the system finally responded. I have not had this problem any other time, so I assume the problem is not a defective keyboard. (I would like to know if these things I've written about are peculiar only to my setup or if they are universal among all Zebra FDD owners.)

I have been working on a disassembly of the Zebra interface ROM. I believe I've identified the subroutine that deals with the use of the "Q" and "S". I am still investigating this routine and have nothing final to report, but on my first glance, I see no reason why it shouldn't work consistently.

My initial review shows that when the Zebra interface ROM sets up a TOS command to the disk controller, it then controls a response using a subroutine which the Zebra Disk Drive Technical Manual (page 28) calls RESPOSTA. This routine lies between 0688 hex and 06DB. If TOS wants a write out of text in the data buffer (2000 to 20FF hex) or from the error message section of the command buffer (210D to 212D), the routine at 03EB to 0423 is called. It is this routine which contains the "S" and "Q" key tests. One noteworthy point about this routine is that it only tests the "S" key at the beginning of the screen printout of text. It can print 256 bytes

from the data buffer before it has to return to the original calling routine. If a directory printout contains less than 257 bytes, the "S" key will not stop it in the middle of a transfer since it is only tested prior to the data printout.

Can a long directory be contained in just 256 bytes? If you look at the line by line printout of the previous sample directory, you will notice that it is mostly empty spaces. The TAB function can easily generate all those spaces in just a few bytes of machine code, so pressing "S" may not necessarily stop even a large directory from scrolling.

Zebra ROM subroutines called by the "S" and "Q" key routines:

000A FDCB01AE RES 5, (IY+01)	RESET SYSTEM VARIABLE FLAG WHICH TRACKS KEYHITS
000E FDCB01DE SET 3, (IY+01)	SET CURSOR MODE 1
0012 CD3003 CALL 0330	CALL KEYBOARD SCANNER IN HOME ROM
0015 B002 DEFB 020B	CLEAR FLAG REGISTER
0017 AF XOR A	TEST WHETHER KEYHIT FOUND
0018 FDCB016E BIT 5, (IY+01)	IF NOT, RETURN TO CALLING ROUTINE
001C C8 RET Z	SYSTEM VARIABLE - LAST KEY
001D 3A085C LD A, (5C0B)	TEST FOR UPPER CASE
0020 FE61 CP 61	RETURN IF UPPER CASE
0022 D8 RET C	IF LOWER CASE, CONVERT TO UPPER CASE AND RETURN
0023 E6DF AND DF	CARRIAGE RETURN
0025 C9 RET	CALL RST 10 IN HOME ROM TO TRANSMIT CARRIAGE RETURN
0026 3E0D LD A, 0D	
0028 CD3003 CALL 0330	
002B 1000 DEFB 0010	
002D C9 RET	

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printout routine:

03EB E5	PUSH HL	SAVE HL, ADDRESS OF TEXT TO BE PRINTED OUT	0418 C8	RET Z	IF SO, RETURN TO CALLING ROUTINE
03EC 3E02	LD A,02	OPEN CHANNEL # 2; 0330 IS THE	0419 7E	LD A,(HL)	PICK UP TEXT BYTE POINTED TO BY HL
03EE CD3003	CALL 0330	CBAS ROUTINE USED TO CALL HOME	041A B7	OR A	TESTS TO SEE IF WE REACHED END OF DATA MARKER, 00 HEX
03F1 3012	DEFB 1230	ROM ROUTINES	041B C8	RET Z	IF SO, RETURN TO CALLING ROUTINE
03F3 3EFF	LD A,FF	POKE SYSTEM VARIABLE WITH FF FOR	041C 23	INC HL	IF NOT END OF DATA OR END OF
03F5 328C5C	LD (5C8C),A	CONTINUOUS SCROLL OF SCREEN	041D E5	PUSH HL	BUFFER THEN GET NEXT ADDRESS TO
03F8 CDA000	CALL 000A	KEYBOARD SCANNER ROUTINE	041E CD3003	CALL 0330	USE CBAS TO RUN HOME ROM RST 10
03FB FE53	CP 53	IS IT THE "S" KEY?	0421 1000	DEFB 0010	FOR TEXT BYTE IN THE A REGISTER
03FD 2007	JR NZ,0406	IF NOT,CONTINUE WITH PRINTOUT	0423 18EE	JR 0413	REPEAT THE END OF DATA AND END OF
03FF CDA000	CALL 000A	IF IT IS "S", KEEP SCANNING			BUFFER TESTS
0402 FE51	CP 51	IS IT THE "Q" KEY?			
0404 20F9	JR NZ,03FF	IF NOT, THEN KEEP SCANNING			
		KEYBOARD UNTIL "Q" IS PRESSED			
0406 CD2600	CALL 0026	THIS DOES HOME ROM RST 10 TO			
		TRANSMIT A CARRIAGE RETURN			
		RESTORE POINTER TO BUFFER BYTES			
0409 E1	POP HL				
040A E5	PUSH HL				
040B 7C	LD A,H	THIS TESTS WHETHER HL POINTS TO			
		COMMAND BUFFER 210D HEX OR TO			
		DATA BUFFER 2000 HEX			
040C 1F	RRA	CARRY WILL BE SET FOR COMMAND			
		BUFFER, AND RESET FOR DATA			
		BUFFER READOUTS			
040D 0600	LD B,00	THIS SETS UP A PRINTOUT OF			
		UP TO 32 BYTES, THE MAXIMUM			
		SIZE OF THE MESSAGE AREA IN THE			
		COMMAND BUFFER			
040F 3802	JR C,0413				
0411 0621	LD B,21	THIS SETS UP A PRINTOUT OF UP TO			
		256 BYTES, THE MAXIMUM LENGTH OF			
		THE DATA BUFFER, 2000 TO 20FF			
		RESTORE BUFFER TEXT ADDRESS			
		TESTS THAT WE DON T EXCEED THE			
		MAXIMUM SIZE OF BUFFER			
0413 E1	POP HL				
0414 04	INC B				
0415 78	LD A,B				
0416 FE21	CP 21				

Note that the keyboard is only tested once for the "S" key, then up to 265 bytes are printed out. When this is completed we return to REPOSTA which sends a DONE message to TOS. If TOS has anything else to output to the screen, it repeats the request for data printout and up to 256 bytes can again be printed. So we only get the chance to stop the screen scrolling every 256 bytes.

When you try the program, you will see the scrolling freeze occasionally and will have to press "Q" to restart it. This shows that the routine does work. I see no software bugs to prevent it from working all the time (i.e., every 256 bytes). I don't know enough about the hardware mechanisms involved in paging in and out the Zebra FDD shadow ROM, but I suspect a timing problem or a keyboard debouncing/reading problem more than a software problem. Does anyone have any suggestions for further study so we can nail down the source of this problem?

# OLIGER SAFE DISK SYSTEM

## USING OLIGER SAFE DOS VERSION 2.52

by Dick Wagner

The final OLIGER SAFE DOS (Disk Operating System) on EPROM is now available as version 2.52. The system is more than just a disk operating system. The additional utilities that John Oliger provides are interesting and useful.

Here are some of the latest features:

1. A fast FOR--NEXT loop routine
2. ERASE /"Filename" command
3. improved cataloging (CAT command)
4. RESTORE /"New disk name" command
5. MERGE /"Name" command

Along with these, there is a well-coordinated version of the MSCRIPT word processor available to use with SAFE DOS, and it is now possible to operate two disk drive operating systems at will, without changing disks! (i.e., OLIGER and LARKEN)

The fast FOR--NEXT loop utility provides a constant speed whenever it is used in a program, giving 9 to 50 times faster operation. Only one such loop is permitted, but it may be mixed with regular BASIC loops. It is simple to implement. The variable must be assigned at the beginning of a program, such as:

```
5 LET /k-1
200 FOR /1 TO 100
255 NEXT
```

The ERASE /"Filename" command permits erasing any disk file, which is great for cleaning up a disk. All consecutive files following the erased file are moved up and the catalog is corrected without blank lines.

The new CAT extended command produces an improved screen display with an added column which shows the starting address for code and data files.

The extended command FORMAT /"name" has been in use from the beginning, as it is always necessary to give the disk a name (even if the name is only " ").

Now the user can change disk names at will with the RESTORE /"New disk name" command. This is handy for formatting disks in advance.

With the new MERGE /"name" command, Oliger makes it possible to append a program to an existing program, without seriously polluting the current program!

Printing a hard copy of the disk catalog is a snap. In the immediate mode, type: LET /P=0 and OPEN #2,"p". Now type CAT, and the display is shunted to the printer in place of the screen.

The OLIGER SAFE disk system and hardware has the unique ability to be compatible with the LARKEN DOS (Disk Operating System), which is supplied in cartridge form, and is available from LARKEN (and RMG Enterprises). Now the user can operate both systems interchangeably at will (with the LARKEN disk in drive 0 and the OLIGER disk in drive 1, for example). The extended commands can be sent to either disk, and even some OLIGER commands can be used in LARKEN programs, such as the fast FOR--NEXT loop routine. As I prefer using the OLIGER DOS, I can purchase programs available only for the LARKEN DOS, make the appropriate program changes, and save a version on the OLIGER.

My personal favorite (and much used) disk operation is in conjunction with MSCRIPT version 5.3. I make a MSCRIPT utility save on each disk I use with this program. A special FILE 0 program is used with LOAD to display the catalog with a moveable cursor. Select MSCRIPT, press ENTER and there it is. Issue the CAT command in the MSCRIPT menu and the catalog is displayed. Select a program to LOAD into MSCRIPT as text, and there is the complete text, including a list of printer commands used with that particular text. A quick delete of the text leaves the printer codes to use as reference.

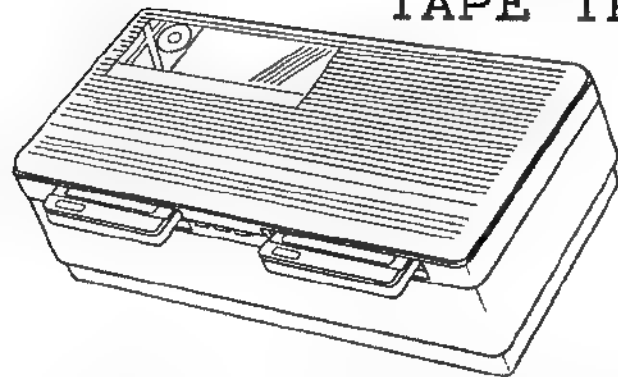
For convenience, I also have the printer codes (52 possible) stored on the same disk as text. It can be loaded at any time, referred to, codes added to the list already in the reference lines, and then be deleted. The alternative is a printed list.

Many large printers provide graphic capabilities where every print pixel is defined. John Olinger uses

the OUT 127,n direct port approach for this type of programming. I prefer to use the LPRINT method commonly used in many computer programs. The LET /P=0 command will not properly send printer codes greater than 127. The word from John, is to make 2 pokes, 23300,60 and 23301,3 to overcome this problem, so that LPRINT CHR\$ n will work properly.

# ROTRONICS WAFADRIVE

## TAPE TRANSFER UTILITY



The following utility program was supplied to TIME DESIGNS by Dave Maccarone, a former authorized distributor of the Rotronics Wafadrive. Rotronics is not longer in business. It should be noted that the following "Tape Transfer Utility" is for the Spectrum computer or the Spectrum-Emulated Timex Sinclair 2068.

When transferring software from cassette to wafer, some kind of transfer utility program is virtually indispensable. The program given here is written largely in BASIC and sets up its own machine code subroutines. The three facilities provided by the program are:

1. READ HEADER: Essential for analysing the attributes of files on cassette. Displays the auto-run line number of BASIC programs, location and length of code files. It works by reading the program header which precedes the file on tape. Beware of false headers.

2. RECLAIM RAM: This option effectively de-initializes the Wafadrive Operating System and reclaims all RAM used. The BASIC program is preserved.

3. STOP: This can be used to load a BASIC program such that it is prevented from auto-running once loaded. It will thus cope with "anti-merge" programs. The auto-run line number is displayed on screen with the program name. The utility program itself is overwritten.

The machine code subroutines used by the program are all relocatable and can be lifted for use in your own programs. Memory saving techniques have been used in the BASIC to assist when working in "confined spaces". The program can be further reduced in size if required by splitting it into three parts and/or by loading the machine code straight into the printer buffer as a separate file.

```
10 PAPER VAL "5": INK NOT PI: BORDER VAL "5": GO SUB VAL "1=3"
20 CLS: PRINT "Enter number:"
30 PRINT " 1 READ HEADER" - loads header from cassette
31 displays file attributes.
40 PRINT " 2 RECLAIM RAM" - de-initialises MOS &
reclaims RAM.
50 PRINT " 3 STOP" - loads BASIC program from cassette,
preventing auto-run.
60 LET a$=INKEY$: IF a$="1" OR a$="3" THEN GO TO 60
70 CLG: GO TO VAL "100"+VAL a$
100 REM HEADER READ
110 PRINT " HEADER READ ""Play tape...": RANDOMIZE USR VAL "2
1320": CLS: LET a=VAL "23296"
120 LET t=PEEK a: LET a=a+SGN PI
130 PRINT "TYPE:", "Program" AND (NOT t); "Number array" AND (t=SGN
PI); "String array" AND (t=VAL "2"); "Bytes" AND (t=INT PI)
140 PRINT "NAME:"; FOR n=SGN PI TO VAL "10": PRINT CHR$ (PEEK
a); LET a=a+SGN PI: NEXT n
150 PRINT "LENGTH:"; PEEK a+VAL "256*PEEK (a+1)": LET a=a+VAL
"2"
160 LET b=PEEK a+VAL "256*PEEK (a+1)": IF NOT t THEN PRINT "AU
TO-RUN:"; IF b<VAL "1=4" THEN PRINT b
170 IF t=INT PI THEN PRINT "START:", b
180 PRINT $NOT PI; "Press a key to return to menu": PAUSE NOT PI
: GO TO VAL "20"
200 REM RECLAIM
210 PRINT " RECLAIM RAM "
220 GO SUB VAL "2=3": CLEAR #: RANDOMIZE USR VAL "23340": GO TO
VAL "20"
300 REM STOP
310 PRINT " STOP ""WARNING! - this program is lost when selec
ted." : GO SUB VAL "2=3"
320 PRINT "The number shown on screen is the line from which
the program would normally auto-run.""Play tape..."";USR VAL
"23369": STOP
1000 RESTORE
1010 DATA "221","33","0","91","221","229","17","17","0","175","5
5","205","86","5","221","225","48","242","251","201"
1020 DATA "219","12","205","46","10","205","159","0","42","99","
92","34","101","92","42","146","92","34","104","92","33","182","
92","1","244","6","193","232","25"
1030 DATA "1","34","0","247","213","221","225","221","34","1","2
55","221","34","15","128","62","1","50","116","92","205","58","7
","62","255","50","68","92","237","75","66","92","205","27","26"
,"207","255"
1040 FOR a=VAL "23320" TO VAL "23405": READ a$: POKE a,VAL a$: N
EXT a: RETURN
2000 REM CONTINUE?
2010 PRINT "Press Y to proceed or any other key to return to m
enu"
2020 PAUSE NOT PI: LET a=PEEK VAL "23560": IF a<>CODE "Y" AND a<
>CODE "y" THEN RUN
2030 CLS: RETURN
```

### \*\*\*\*\* P U Z Z L E O F T H E M O N T H \*\*\*\*\* CEDRIC R. BASTIAANS

The GIVENS of this puzzle are:

- There are 5 children, all more than 1 year old and younger than 25.
- Their combined ages total 40.
- The product of the boys' ages is 39 times the product of the girls' ages.
- Next year, the product of the boys' ages is an even number of times the product of the girls' ages.

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\*\*\*\*\*  
**THE SOLUTION OF THE PUZZLE OF THE MONTH**  
 \*\*\*\*\*

CEDRIC R. BASTIAANS

First, we'll give the children some simple names, very simple like a, b, c, d and e.

Then, we will assume that there are 3 girls and 2 boys. Maybe it's the other way around, but we'll see.

Furthermore, the number 39 can only be composed of  $1 \times 39$  or  $3 \times 13$ . What this means is that one of the boys simply HAS to be 13 years old, while another boy's age HAS to be divisible by 3. We say thus write:

$a=13$  and  
 $b=3t$ , where  $t=1,2,3,\dots,B$  (maximum B, because no one can be older than 24).

The girls being called c,d and e, we may write (algebraically):

$39cde = 13(3t) \quad \text{or} \quad cde = t \dots\dots\dots(1)$

Also:

$c+d+e+13+(3t) = 40 \quad \text{or} \quad c+d+e = 27-3t \dots\dots\dots(2)$

Since c,d and e are older than or as old as 2 years, we can write:

$cde \geq 8 \dots\dots\dots(3)$

and  $c+d+e \geq 6 \dots\dots\dots(4)$

From equations (1) and (3) follows that:

$t \geq 8 \dots\dots\dots(5)$

On the other hand, from (2) and (4) we find:

$t \leq 7 \dots\dots\dots(6)$

Equations (5) and (6) contradict and the truth is therefore that we have THREE boys and only TWO girls!

The situation for the 3 boys a, b and c and the 2 girls d and e is therefore a trifle different:

$39de = 13(3t)c \quad \text{or} \quad de = tc \quad \text{or} \quad c = de/t \dots\dots\dots(7)$

while, however, equation (2) still holds true!

Substituting for c in (2) yields:

$3tde/t+d+e = 27$

or  $3t^2+de+dt+et = 27t$

or  $t^2+de+dt+et = 27t-2t^2$

or  $(d+t)(e+t) = t(27-2t) \dots\dots\dots(8)$

We may thusly write the following program:

```
10 LET A=13
20 FOR T=2 TO 7
30 LET B=3*T
40 REM EQUATION (8): LET SUM=T*(27-2*T)
50 FOR D=2 TO 24
60 FOR E=D TO 24
70 REM EQUATION (7): LET C=D*E/T
80 IF C=INT(C) AND (D+T)*(E+T)=SUM THEN
  GOSUB 1000
90 NEXT E
100 NEXT D
110 NEXT T
120 STOP
```

1000 REM NEXT YEAR AND SOLUTION

1010 LET X=(A+1)\*(B+1)\*(C+1)

1020 LET Y=(D+1)\*(E+1)

1030 IF X/Y=INT(X/Y) THEN PRINT

"THE BOYS ARE "A"; "B";

" AND "C" YEARS, THE GIRLS

ARE "D"; AND "E";."

1040 RETURN

With this program keyed into my TS2068, it displayed the solution in 11 seconds  
 BOYS 13, 9 and 8; GIRLS 4 and 6.

## A Letter From Fred Nachbaur (concerning the PC8300 "Timex Clone")

Dear Tim,

I read with interest Bruce C. Taylor's article on the PC8300, since I have been quite deeply involved with this machine. I would like to clarify some of the points brought up by Mr. Taylor.

The 50/60 Hz. signal diode serves exactly the same function as pin 22 of the ZX81/TS1000 ULA. The video frame rate has nothing to do with the power-line frequency; instead, it is determined by the that unique blend of hardware and software that constitutes the ZX display system. In the PC8300, the 50/60 Hz. diode goes to an input port. Each time through the display loop, the software checks whether this port is high or low, adjusting the MARGIN system variable accordingly.

It should be noted that the machine (and the ZX81, for that matter) runs about 50% faster, overall, in SLOW mode, if it is in the 50 Hz. mode. This is because the system has more time between frames to work on your program. My ROM improvement (more about that later) allows MARGIN to be changed by the user, and always defaults on power-up at 60 Hz. regardless of whether the diode is connected or not.

There is most certainly a clock component on the PC8300 board. It is exactly the same as on a ZX81, a 6.5 MHz. ceramic element just to the left of the ULA, in front of the modulator. This behaves electrically just like a crystal; the only significant difference is that the frequency stability and precision is less than that of a crystal. For most jobs, however, the variance is negligible.

There is also most certainly a Z80A on the board. This is the large chip in the centre. Mr. Taylor may have been confused by the fact that some manufacturers of the Z80A give it their own part number. The designation Z80C is particularly common. There is absolutely no difference between such chips and Z80A's marked as such.

Regarding place of origin, it does say "Made in Hong Kong." However, the manual is written in the Chinese dialect of the mainland. Draw your own conclusions.

There is nothing strange about the fact that the 1 REM location is 793 bytes higher on the PC8300, than it is on the ZX81 family. There is also nothing mystical about memory allocation. The only difference is the location of the display file. On the ZX81, it rides above the BASIC program. It therefore moves about as BASIC lines are added and deleted. On the PC8300, however, the display file is always at a fixed location BELOW the program area. What do you get when you multiply 24 lines by 33 bytes per line and add 1 for end-of-file marker? That's right, 793.

The PC8300 will successfully load ZX81 programs that are entirely in BASIC. It does this by looking at the VERS variable, adjusting how it perceives the incoming data as required. However, because of the way the display file location was modified, it will NOT load any BASIC variables associated with the Sinclair program. So if your program is, for instance, a mailing-list, you can load the program but not your data.

Worse, the different location of the first program line means that machine-code won't run unless it was written to be position-independent, and you adjust all USR calls accordingly. Even worse, no ROM calls are allowed since the ROM routines were completely scrambled, presumably to help prevent copyright hassles. For all practical purposes, one can consider that it is completely incompatible with ZX81 machine-code.

There are also some relatively minor, though potentially troublesome changes in the system variables. You have to be aware of these if you intend to write machine-code for this computer.

It is not possible to use a straight Timex or Sinclair ROM with the PC8300. Rather, it isn't practical. The reason is that the hardware of the display system is sufficiently different to cause the display to be "wonky," for lack of a better word.

I have developed a Timex-compatible ROM which runs all known low-res Timex programs, including machine-code. The only programs that won't run, are high-res programs and SOME "banner" programs.

The other hardware-dependent factor is the character set. These are NOT housed in the top 512 bytes of the ROM, as on the

Sinclair. Rather, they are contained within the custom chip, and are the reason that high-res won't work no matter what we do. There is no point, even, in trying to revector the I register; actually a blessing, since it is now available to the programmer. For instance, IM2 (interrupt mode 2) is theoretically usable with this machine. On the down side, some of the Sinclair punctuation (: ? and the pound sign) still remain game characters, and the grey graphics are right triangles and a "race car".

Otherwise, the PC8300 behaves just like a TS1000 with the new ROM. Even the keywords were reverted to their original key locations. Keywords are, of course, entered with a single key-stroke.

To make up for the few remaining shortcomings of my Timex-compatible ROM, it sports a few added features, some of which are not available either on the ZX81 or the stock PC8300. A new BEEP keyword turns beeping keys on or off. The REM command is now used to turn the blinking cursor on or off, in addition to its use as a REMark statement. A BASIC single-stepper ("debugger") is included. The machine can be set to make an audible noise when loading or saving a program.

Hardware-wise, there is nothing "different" about the electrical characteristics of the edge-connector lines. The problem is that some of them are missing. That's right, the edge traces go absolutely nowhere. Most of these (WAIT\*, BUSRQ\*, BUSAK\*, HALT\*, NMI\*, etc.) are not commonly used by external peripherals. At least one, however, is relatively vital; this is MI\*. If this line is brought out, the PC8300 will work with Timex/Sinclair-compatible 64K RAMPacks. Incidentally, no modification is needed to run machine-code in the 32-48K region. In this respect, it is like the TS1500.

Even without the MI\* or other lines connected, the '8300 works with most ordinary Timex peripherals, such as the 2050 modem, 16K RAM, 2040 printer, many "big-printer" interfaces, and so on. One notable exception would be the Olliger Video Upgrade, again because the ROM does not contain the character patterns. Other devices that would not work include anything with an EPROM that overlays the ROM (e.g. the Memotech parallel interface), or contains ROM calls (e.g. the A&J Stringy-Floppy).

In my (admittedly biased) opinion, the PC8300 is virtually useless, unless its ROM is changed to make its claim of "Timex compatibility" at least 90% justifiable.

Regards,  
Fred Nachbaur

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## CKTYPE 1000 (M/C VERSION)

by Earl V. Dunnington

Now thanks to Earl, we have a sum-checker program for the TS1000/TS1500/ZX81, Just like the one Stan Lemke introduced for the TS2068 in TDM, May/June '88.

The Machine Code is not relocatable and the program requires a minimum of 16K RAM. Those readers who wish to use the CKTYPE listings should LOAD the final BASIC version before proceeding.

Listing K is the final decimal machine code data, after deleting the unused portion of the Run Time Package. Included in the code is a routine to load a program from tape, defeating the autorun. This is necessary as some programs may contain machine code that would be loaded into the area where the code for CKTYPE 1000 will reside, if they were allowed to autorun. The loading routine will not work if you play the tape before the end of any program proceeding the one you wish to load.

Listing L is a program that will convert the machine code data into the corresponding character (CHR\$) and enter it into the dimensioned string A\$. This program will also produce a printout in the same format as Listing K, so that you can check the data. To correct an error, use the direct command:

```
LET A$(n)=CHR$ c
```

where n= the string character number and c= the correct decimal code.

WARNING: FROM THIS POINT ON, DO NOT USE CLEAR, DIM A\$, NEW, OR RUN. These commands would erase A\$.

Listing M is the CKTYPE printout for the program of Listing L.

After entering and checking all of the M/C data, program lines are to be deleted or added so that the program will now appear as in Listing N. After POKEing some additional machine code into the REM statement using the direct command GOTO 2 and deleting lines 2 to 6, this becomes the final CKTYPE 1000 M/C program. To SAVE the program on tape, use the direct command: GOTO 20.

Listing O is the CKTYPE for Listing N before using the command GOTO 2.

When LOADED, the program will:

Set RAMTOP to 32085

POKE the machine code stored in A\$ into the addresses above RAMTOP starting with 32086

Clean the memory below RAMTOP in

preparation for either typing in a program or LOADING a program from tape for which a CKTYPE listing is desired

Instructions for operating the programs will be displayed on the screen. Anyone needing more detailed instructions, send an S.A.S.E. to me at 4356 King Theodore Dr. Boynton Bch., FL 33436. Comments on this series of articles are also solicited.

## LISTING K

A\$(1)	33	125	64	34	116	125
A\$(7)	33	13	64	205	255	125
A\$(13)	235	33	0	1	205	173
A\$(19)	125	235	33	12	64	205
A\$(25)	252	127	235	225	25	34
A\$(31)	116	125	42	116	125	34
A\$(37)	120	125	33	0	0	34
A\$(43)	122	125	33	0	0	34
A\$(49)	124	125	33	0	0	4
A\$(55)	126	125	42	120	125	205
A\$(61)	252	127	235	33	0	1
A\$(67)	205	173	125	229	17	1
A\$(73)	0	42	120	125	25	205
A\$(79)	252	127	235	225	25	34
A\$(85)	122	125	173	0	0	42
A\$(91)	120	125	25	34	120	125
A\$(97)	17	1	0	42	120	125
A\$(103)	25	205	255	127	235	33
A\$(109)	0	1	205	173	125	229
A\$(115)	42	120	125	205	252	127
A\$(121)	235	225	25	34	124	125
A\$(127)	17	2	0	42	120	125
A\$(133)	25	34	120	125	33	1
A\$(139)	0	34	125	125	33	1
A\$(145)	0	34	130	125	42	124
A\$(151)	126	34	125	125	33	1
A\$(157)	0	34	134	125	33	252
A\$(163)	125	34	136	125	237	91
A\$(169)	125	125	42	125	125	25
A\$(175)	17	1	0	25	229	420
A\$(181)	120	125	205	252	127	235
A\$(187)	225	25	34	125	125	420
A\$(193)	122	125	205	10	127	34
A\$(199)	122	125	17	1	0	42
A\$(205)	120	125	25	34	120	125
A\$(211)	205	201	127	130	125	253
A\$(217)	203	1	205	42	122	125
A\$(223)	205	44	127	33	5	0
A\$(229)	205	153	127	205	105	127
A\$(235)	14	0	112	42	124	125
A\$(241)	205	44	127	33	13	0
A\$(247)	205	163	127	205	105	127
A\$(253)	14	0	112	42	125	125
A\$(259)	205	44	127	62	115	215
A\$(265)	253	203	1	142	337	91
A\$(271)	116	125	42	120	125	205
A\$(277)	24	127	203	143	127	124
A\$(283)	125	205	248	127	0	0
A\$(289)	0	0	0	0	0	0
A\$(295)	0	0	0	0	0	0
A\$(301)	0	0	0	0	0	0
A\$(307)	0	0	205	231	0	205
A\$(313)	211	27	205	67	0	201
A\$(319)	1	0	0	195	117	11
A\$(325)	197	5	16	124	77	33
A\$(331)	0	0	41	203	17	23
A\$(337)	48	1	25	16	247	195
A\$(343)	201	14	0	124	170	233
A\$(349)	128	71	213	205	0	121
A\$(355)	227	205	0	127	235	225
A\$(361)	121	167	40	54	120	177
A\$(367)	229	237	98	237	82	229
A\$(373)	193	203	33	0	0	33
A\$(379)	63	245	122	63	30	0
A\$(385)	41	48	5	143	237	74
A\$(391)	24	0	135	237	74	55
A\$(397)	3	237	66	61	60	20
A\$(403)	32	236	95	241	45	255
A\$(409)	203	75	32	1	235	203

```

A$(415) 127 200 24 11 205 154
A$(421) 125 203 16 208 24 3
A$(427) 124 7 200 235 167 237
A$(433) 98 237 32 201 124 181
A$(439) 33 0 0 192 44 201
A$(445) 1 0 128 24 4 235
A$(451) 1 1 128 124 168 103
A$(457) 122 168 37 237 32 36
A$(463) 0 121 111 216 239 1
A$(469) 111 201 58 33 64 203
A$(475) 71 32 26 203 79 32
A$(481) 10 203 124 40 6 62
A$(487) 22 215 205 3 127 1
A$(493) 240 216 30 255 197 205
A$(499) 225 7 205 173 10 229
A$(505) 193 33 93 64 87 30
A$(511) 28 112 203 122 40 1
A$(517) 113 151 237 111 131 215
A$(523) 151 237 111 131 215 203
A$(529) 122 203 250 40 239 201
A$(535) 225 126 35 254 112 40
A$(541) 47 254 118 32 3 215
A$(547) 24 243 205 148 126 24
A$(553) 238 151 24 2 62 144
A$(559) 75 69 33 48 64 86
A$(565) 119 213 229 205 178 11
A$(571) 225 209 114 201 205 10
A$(577) 127 124 161 227 94 35
A$(583) 86 35 227 192 225 235
A$(589) 233 125 230 31 79 253
A$(595) 203 1 78 40 10 253
A$(601) 150 35 203 255 198 80
A$(607) 212 113 8 253 134 57
A$(613) 254 33 58 58 64 222
A$(619) 1 205 250 8 253 203
A$(625) 1 198 201 225 94 35
A$(631) 86 35 229 213 33 7
A$(637) 0 25 6 4 86 43
A$(643) 94 43 213 16 249 225
A$(649) 193 209 122 25 235 225
A$(655) 227 115 35 114 197 225
A$(661) 7 48 1 235 205 18
A$(667) 127 225 216 193 233 235
A$(673) 115 201 193 229 193 201
A$(679) 110 38 0 201

```

#### LISTING L

```

20 DIM A$(682)
170 PRINT "WORKING FROM LEFT TO
RIGHT. ENTER A DATA VALUE"
180 FOR N=1 TO 682
185 INPUT DATA
190 LET A$(N)=CHR$(DATA)
200 NEXT N
201 PRINT AT 0,0,"TO OBTAIN A P
RINTOUT OF A$, TURN ON PRINT
ER AND PRESS A LET-TER KEY OTHER
WISE PRESS BREAK"
202 PAUSE 32768
203 FOR N=1 TO 682 STEP 6

```

```

204 LPRINT TAB 0,"A$(",N,")",TA
B 8,CODE A$(N),TAB 12,CODE A$(N+
1);TAB 16;CODE A$(N+2),TAB 20,CO
DE A$(N+3),TAB 24,CODE A$(N+4),T
AB 28;CODE A$(N+5)
205 NEXT N
206 PRINT AT 0,0,"TO CORRECT AN
ERROREDUS VALUE, USE THE DIREC
T COMMAND"
$ DATA WHERE N=THE C
HARACTER NUMBER IN THE STRING AN
D DATA IS THE COR-RECT VALUE"
210 STOP

```

#### LISTING M

```

20 15 992
170 54 2300
180 21 1497
185 6 539
190 13 922
200 3 417
201 114 4567
202 13 816
203 29 2088
204 163 8429
205 3 417
206 191 6918
210 2 348

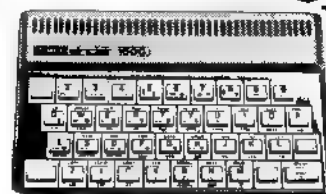
```

#### LISTING O

```

1 6 483
2 21 1248
3 22 1249
4 22 1215
5 23 1335
6 23 1265
10 2 375
20 10 705
30 2 350
40 22 1236
50 23 1344
60 22 1581
70 21 1287
80 21 1485
90 23 1593
100 22 1216
110 23 1338
120 14 1031
130 10 17
140 190 9214
150 140 5816
160 91 3942
170 13 816
180 21 1497
190 22 1543
200 3 417
210 2 351

```



#### LISTING N

```

1 REM 1234
2 POKE 16510,0
3 POKE 16514,49
4 POKE 16515,81
5 POKE 16516,125
6 POKE 16517,201
10 RETURN
20 SAVE "CKTYPE"
30 FAST
40 POKE 16388,85
50 POKE 16389,125
60 POKE 32084,62
70 POKE 32083,0
80 POKE 32082,6
90 POKE 32081,116
100 POKE 16386,81
110 POKE 16387,125
120 RAND USR 16514
130 GOSUB 10
140 PRINT AT 0,9,"CKTYPE 1000
";AT 2,0;"1. RAMTOP HAS BEEN SET
AT 32085";AT 4,0;"2. PRESS A LE
TTER KEY TO MOVE M/C ABOVE RAM
TOP AFTER MAKING A NOTE OF THE F
OLLOWING"
150 PRINT AT 8,0;"3. WHEN CURSO
R APPEARS, EITHER TYPE IN A PRO
GRAM OR LOAD A PRO-GRAM FROM TA
PE USING THE DIRECT COMMAND RAND
USR 32394"
160 PRINT AT 13,0;"4. TO LPRINT
A CKTYPE LISTING. USE THE DIRE
CT COMMAND RAND USR32056"
170 PAUSE 32768
180 FOR N=1 TO 682
190 POKE N+32085,CODE A$(N)
200 NEXT N
210 NEW

```

## FOR YOUR QL ARCHIVE SECRETS

by Real Gagnon

ARCHIVE is a powerful database program but there are some little known secrets that can make life easier to every programmer.

ARCHIVE version 2.35 introduced a whole new control characters set which are undocumented in the ARCHIVE reference manual. These characters adds more options to the ARCHIVE PRINT command. A complete list can be found in the ARCHIVE RUN-TIME manual only available from PSION or maybe from a few QL dealer.

We learn that some characters with ASCII code inferior to 32 get special attention from the ARCHIVE screen driver.

Some of these characters have their equivalent in ARCHIVE language, for example, take CHR(1), it can be used to set the INK color, the form is CHR(1)+CHR(n) where n is the color number (same number as in SUPERBASIC).

PRINT "This a"+CHR(1)+CHR(2)+"test" is equivalent to PRINT "This a ";ink 2;"test" .

But some of these codes have a more unique effect, let's see some of them.

CHR(4)+CHR(c)+CHR(r) is very useful, CHR(c) will be repeated "r" times. If we have PRINT CHR(4)+"\*"+chr(80), the character "\*" will be displayed 80 times on the screen.

CHR(5) is an underline switch. Try this: PRINT CHR(5)+"SINCLAIR"+CHR(5)+" QL"

CHR(6) moves the cursor to the right  
CHR(8) moves the cursor to the left

CHR(9)+CHR(c) same as SUPERBASIC PRINT TO c, where c is the column number.

CHR(10) moves the cursor down  
CHR(11) moves the cursor up

CHR(12) erases the screen like CLS.

CHR(14) then you see the cursor flashing

CHR(15) then you don't see the cursor flashing

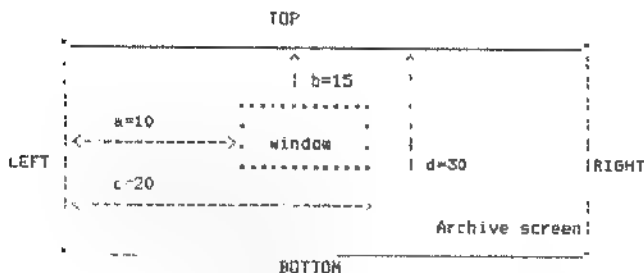
CHR(18)+CHR(n) is the equivalent to the SUPERBASIC OVER command.  
 n=0 then PRINT with INK on current PAPER  
 n=1 then PRINT with INK with TRANSPARENT paper, it's overprinting.  
 n=2 then PRINT with INK but XOR the data on the screen.

CHR(20)+CHR(a)+CHR(b)+CHR(c)+CHR(d) creates a WINDOW.  
 The coordinates are in "characters".  
 "a" is the left margin from the left side of the screen.  
 "b" is the top margin from the top of the screen.  
 "c" is the right margin from the left side of the screen.  
 "d" is the bottom margin from the top of the screen.

An example will help to understand the ARCHIVE WINDOW creation.

PRINT CHR(20)+CHR(10)+CHR(15)+CHR(20)+CHR(30)

will create the following WINDOW.



There is only one active WINDOW at one time.  
 The initial ARCHIVE WINDOW is defined with the following parameters:  
 CHR(20)+CHR(0)+CHR(0)+CHR(80)+CHR(25)

CHR(21)+CHR(n) scrolls up "n" lines.  
 CHR(22)+CHR(n) scrolls down "n" lines.  
 CHR(23)+CHR(n) scrolls left "n" columns.  
 CHR(24)+CHR(n) scrolls right "n" columns.

CHR(26) exchanges the PAPER with the INK, it's INVERSE printing.

CHR(27)+CHR(n) is for special CLS.  
 n=65, CLS from the cursor position to the end of line.  
 n=66, CLS from the cursor position to the end of the screen/window.  
 n=67, STORE the cursor position.  
 n=68, RESTORE the cursor position.

CHR(30) puts the cursor at the position 0,0 without erasing the screen.

CHR(31)+CHR(a)+CHR(b) Same as AT a,b . PRINT at line "a", column "b".

There is more control codes, but these are the most useful ones.

A very useful undocumented feature with the SEDIT command is hidden in ARCHIVE version 2.35.

When designing a screen, ARCHIVE provides some graphic characters to draw boxes. To use them, in SEDIT, do F5 and after press any key between "a" and "k". When drawing a box, you don't have to press each time F5 and the right key because SEDIT gives an easy way to repeat the last typed characters, just keep your finger on SHIFT and press a cursor key.

These graphic characters are similar to those found on IBM GRAPHICS compatible printer. Run the following program to print a reference sheet for the 11 new characters with the corresponding ARCHIVE codes. Your printer must be set for the IBM GRAPHICS character set #2, but anyway if your printer do not have the capability to print them, you can still use them in ARCHIVE!

SuperBasic program to print a reference sheet for ARCHIVE graphic characters.

```
1 REMark by Real Gagnon Montreal May 1988
2 :
10 OPEN #4,ser1
20 :
30 PRINT #4,".ARCHIVE graphic characters (SEDI)"
35 PRINT #4," function key F5 then one of the following keys!"
37 PRINT #4,CHR$(27);"A";CHR$(18) : REMark set line spacing (opt.)
40 PRINT #4,"KEY ", " CHARACTER", " ARCHIVE code"
45 RESTORE
47 :
50 REPEAT loop
60 READ sed,ibm,q1$
70 PRINT#4, CHR$(sed),CHR$(ibm),,q1$
80 IF sed=107:EXIT loop
90 END REPEAT loop
95 :
100 DATA 97,179,"224" :REMark a
110 DATA 98,180,"225" :REMark b
120 DATA 99,191,"226" :REMark c
130 DATA 100,192,"227" :REMark d
140 DATA 101,193,"228" :REMark e
150 DATA 102,194,"229" :REMark f
160 DATA 103,195,"230" :REMark g
170 DATA 104,196,"231" :REMark h
180 DATA 105,197,"232" :REMark i
190 DATA 106,217,"233" :REMark j
200 DATA 107,218,"234" :REMark k
```

#### .ARCHIVE GRAPHIC CHARACTERS (SEDI) FUNCTION KEY F5 THEN ONE OF THE FOLLOWING KEYS:

KEY	CHARACTER	ARCHIVE CODE
A		224
B	├	225
C	┤	226
D	└	227
E	┌	228
F	T	229
G	┐	230
H	┘	231
I	┑	232
J	┒	233
K	┓	234



# PC-IMPORT

## How Does This IBM Translator Software Package From MINNY ELECTRONICS Stack Up??

reviewed by Michael E. Carver

This package bills itself as "a file transfer and BASIC language dialect translator". PC-IMPORT will allow the user, who has access to an IBM Personal Computer (or compatible) equipped with a communication board and a QL, to "download" and translate MicroSoft BASIC programs into SuperBASIC, which will run independently on the QL. After a couple of false starts, I was able to successfully import IBM BASIC programs into my QL.

The first problem was hardware oriented. The manual assumes the user has a ready-made RS-232 cable. As I built my own cable, there were some problems not addressed in the accompanying manual. The QL serial ports only have 5 lines (GND, Tx, Rx, DTR, and CTS). The IBM serial ports have 9 different lines. In order for IBM BIOS to send messages out the serial port, both the DSR and CTS lines must be "true". I had to "tie" the DSR and CTS pins on the IBM together, to achieve communications from the IBM to the QL. This was accomplished by soldering a "jumper" wire between pins 5 and 6 (CTS & DTR) on the IBM cable end.

The other false start was due to an error in the manual. The manual provides step-by-step instructions on preparing MS-DOS to send information out its RS-232 port. To accomplish this, the printer output (LPT1) is directed to the communication output (COM1). The instructions successfully got me to this point, but the steps to direct a copy of the BASIC program to the printer output was in error. "COPY A: [file\_name] LPT1" would not work. This should have read, "COPY A: [file\_name] LPT1". With this minor correction, I received data from the IBM successfully every time.

Before a BASIC program is transferred to the QL, it must be in ASCII format. The manual provides sufficient instruction on how to insure the BASIC files are in ASCII. As the program is "sent" to the QL, it is written to a file on a user-specified microdrive. The transfer portion of PC-IMPORT is straightforward and quick. The transfer rate is 4800 baud and only takes seconds.

The most important part of the program is the translation of IBM's BASIC into SuperBASIC. As PC-IMPORT is written entirely in BASIC, the translation is slow. Approximately 2.8 bytes are translated per second. A 4551 byte program took 27 minutes and 16 seconds to translate. The manual claims that up to 90 percent of the translation work can be achieved by PC-IMPORT. I found this figure to be highly overstated. Only a portion of non-compatible MicroSoft BASIC is translated into SuperBASIC (see Table 1). A fair knowledge of BASIC programming, and an ability to follow a BASIC listing to fathom the flow and logic are required to successfully get most imported BASIC programs to run on the QL.

As an acid-test, I took a text-manipulation program I had written on an IBM at work as an example. The program includes no graphics and simply accepts input from the keyboard. It then breaks up the text into proper spacing for book card labels. Due to major differences between the way the IBM BASIC handles string manipulation and undefined variables, I ran into many problems getting the program to run on the QL. Even though I had written the program, it was hard to follow the logic and correctly make the "hand-translations" required. One of the major problems was caused by the incomplete PC-IMPORT translation of the MIDS command.

A 2048 byte program (translated in 12:09 minutes) took me about 20 to 25 minutes to re-edit and hand-translate to achieve proper execution. I would not have been able to achieve this without the constant referral to the MicroSoft BASIC manual. I have had

limited experience in BASIC programming on an IBM. (I would like to take a second to applaud the Sinclair BASICs. They are far easier languages to program, than MicroSoft BASIC.) If you do not have access to a MicroSoft manual, check your local library, you'll probably need it. As SuperBASIC will mark any BASIC line with "MISTAKE", the "hand-translation" job is made easier. The PC-IMPORT manual does provide a small table of BASICA commands with SuperBASIC equivalents, if any.

Most of the programs I imported dealt with graphics, but none of the graphic commands are translated by PC-IMPORT. One thing to keep in mind when translating most BASICs into Sinclair BASIC, is that their graphic screens are upside down (point 0,0 is in the upper-left-hand corner). Many of the IBM graphic commands can be imitated by creating procedures with SuperBASIC, to achieve the proper results (see Listing 1).

Some other uses for PC-IMPORT, which aren't mentioned in the manual, include: downloading BASIC ASCII files from bulletin boards and translating them into SuperBASIC. Using QUILT to type in a BASIC listing, printing it to a microdrive file and using PC-IMPORT to translate. The printer drive with QUILT

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will need to be altered to print a useable file to the microdrive (see Table 2). One may also use a simple program to enter an IBM listing directly into a microdrive file (see Listing 2).

I have mixed feelings about PC-IMPORT. It is slow and incomplete. PC-IMPORT must be viewed only as a programmer's tool. To achieve full usefulness from PC-IMPORT, the user must be a fair to accomplished BASIC programmer. If one has access to an IBM (or any other "on-line" source of MicroSoft BASIC), a lot of typing and raw translating can be avoided. I believe that PC-IMPORT could have been a much better program had other IBM BASIC commands been supported (i.e., PSET, INSTR, SPACE\$, "\", or Interger Division, LOG). Also commands such as MID\$ should have been fully translated, or RANDOMIZE should have been translated to the British spelling. I only hope that Minny Electronics will provide updated versions of this product in the future.

This program was obtained for review from: RMG Enterprises, 1419 1/2 7th Street, Oregon City, OR 97045, (503) 655-7484.

#### LISTING 1

```
1450 REMARK ---- MicroSoft BASIC command to draw a box
1452 REMARK ---- The two co-ords are adjacent corners of the box
1454 REMARK ---- followed by ink color -- B = box or BF = Fill
1460 REMARK ---- LINE (IX1,IY1)-(IX2,IY2),RND*2+1,BF
1462 :
1464 REMARK ---- SuperBASIC translation using PROCEDURE box
1466 box IX1,IY1,IX2,IY2,RND(1 TO 7),1
1468 :
1470 REMARK ---- LINE (IX1,IY1)-(IX2,IY2),0,B
1472 box IX1,IY1,IX2,IY2,0,0: REMARK SuperBASIC translation
1474 :
9000 DEFine PROCEDURE box (x,y,xc,yc,crayon,all)
9005 FILL all: INK crayon
9010 LINE x,y TO xc,y TO xc,yc TO x,yc TO x,y
9015 FILL 0
```

Table 1 -- IBM commands translated into Super BASIC

INPUT	DATA	THEN
GOTO	GOSUB	TAB
TO	'	ASC
COLOR	SQR	SGN
LOCATE	LEFT\$	MID\$
RIGHT\$	STRING\$	ELSE
VAL		

Table 2 -- Quill Printer Driver for ASCII BASIC

DRIVER NAME	:BASIC
PORT	:ser1
BAUD RATE	:9600
PARITY	:NONE
LINES/PAGE	:255
CHARACTERS/LINE	:255
CONTINUOUS FORMS	:YES
END OF LINE CODE	:LF
PREAMBLE CODE	:NONE
POSTAMBLE CODE	:NONE

All other options :NONE

NOTE: To send the ASCII BASIC to microdrive, the above printer driver must be installed or be present on the default drive (usually #1) as "PRINTER\_DAT". Select the Print option from within Quill and direct output to [Device filename] instead of the printer.

# MANDELBROT -- A Fractal World UPDATE

by Michael E. Carver

As I was developing the mandelbrot program, I was unable to drive my monitor in FI mode. I was unaware of the difference between the height of the characters as sent to the Screen. The following listings will allow complete viewing of the mini\_menu area and the "canvas" while the Mandelbrot Sets are being drawn (when the QL is in FI-Monitor mode).

Key-in and run the following Listing. This contains a short machine code routine to send only 8 lines of pixel information for each character (as opposed to 10 in Monitor mode). The program will self-install into the machine and save to MDV1\_.

```
10 REMARK **** loader for 8B.YINC assign
20 a=RESPR(48): RESTORE
30 FOR x=0 TO 67 STEP 2
40 READ num: POKE_M (a+x),num
50 END FOR x
60 $BYTES mdv1_YINC_code,a,68
1000 DATA 17914,56,8316,1,1,28681,38463,28835
1010 DATA 8316,2,2,28681,38463,28835,28688,9326
1020 DATA 48,-16132,48,-18816,8318,-22528,17914,12
1030 DATA 28681,38463,28835,28672,28885,12668,8,48
1040 DATA 28672,28885
```

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Insure that your Master Mandelbrot cartridge contains a copy of the newly created code (YINC\_code). Insert (or merge) the following listing into the BASIC listing of the Mandelbrot program:

```
1985 CALL yinc
2555 yinc=RESPR(68): LBYTES mdv1_yinc_code,yinc: CALL
yinc
2985 CALL yinc
3755 CALL yinc
4685 CALL yinc
4665 CALL yinc
```

# Time Designs Tests

GRAM, Archivist MP, Text87, & Mailbag

by Mike de Sosa

QJump's GRAM v. 1.16 \* \* \* \* 1/2

Earlier versions of Tony Tebby's GRAM, tested as part of the Sandy SuperQBoard system, troubled me, but now I realize that this was mainly due to flaws in the system and not in the GRAM software, itself. Then there were the spurious rumors that Tony had designed GRAM to be incompatible with the software of some of his competitors (Supercharge and Qliberator, to name two). Whatever the whole truth, much is now improved. GRAM now seems to work well with SPEED-SCREEN, Trump Card and other disk interfaces and RAM packs, but not with FLASHBACK or TurboQuill--two top-notch programs.

GRAM comprises RAM-based utilities for the QL: a full multitasking front end, pop-up menus (within your Psion programs), fast and versatile RAMdisk software, dual-keystroke hotkeys, screen and window dumps, spoolers, a good compatibility with Tebby's QDOS and SUPERTOOLKIT II and other software, and many other utilities.

GRAM, already very efficient as it comes, offers many opportunities for customization. In its "stock" configuration, it "comes up" in the standard QL dual-screen format. Keying Alt / from the SuperBASIC format or within Psion or other programs presents the initial pop-up menu with six main options (FILES, JOBS, CHANNELS, PRINT, WINDOW DUMP, OPTIONS, and several redundant controls for QUIT, HELP, and moving the menu window. Two methods of selecting options are always available: by means of a pointer controllable with the cursor or QINI (QL Internal Mouse Interface) and by keying the first letter of an option. The SPACE bar is usually used to select an action or file, and ENTER to execute a selected command.

GRAM is most economical in the use of keystrokes required to get into, out of, and between programs, especially if one customizes the BOOT and HOTKEY files. As many runs of one or more programs can be multitasked and switched between as memory permits and this capability is enhanced by Grabber, a utility which modifies programs such as Psion's QL QUILL so that they don't gobble up all available memory. A fraction of a star is deducted for its sometimes difficult or skimpy documentation and because it is not, at least in this version, compatible with some important new programs. If TASKMASTER is the Mercedes Benz of full-featured multitaskers, GRAM is the BMW, handier and superior in some ways.

**HOT TIPS:** Grabber-modified Psion programs and RAMdisk software (RAMprt) is usable separately without GRAM.

About \$55, but make sure it's version 1.16!

A.R.K.'s ARCHIVIST MP \* \* \* \* 1/2

Applied Research Kernel Distribution's ARCHIVIST MP database manager is not an upgrade of ARCHIVIST 128, but a quantum leap forward. MP is for Multi-file Programmable: it can open and use up to 20 files at a time and may be programmed at several levels and in many ways to meet special requirements--it can access up to 200,000 records (over 100,000 with Trump Card). (It is also compatible with ARCHIVIST 128 files and screen formats and can use QL ARCHIVE database, screen, and export files.)

Making use of Run-time ARCHIVE, it runs alone but is programmable using QL ARCHIVE v. 2.36 (ARCHDEV). A control file option is available by which one can set up a multi-file system and automatically copy selected database and screen files to RAMdisk at turn on, enabling rapid access to data. Entering the name of a single control file can initiate use of a comprehensive system of database files and multiple screen formats. Global searches of various types can be undertaken among open files.

To simplify matters, ARCHIVIST MP makes use of a standard 22 renamable fields of up to 69 characters, one field per line. This arrangement is extremely practical--most database designers fail to "keep it simple, stupid," and create their own pitfalls.

ARCHIVIST MP is in many ways comparable to high-capacity database handlers like dBase 3: rational menu structures offer single keystroke access to various functions and "external" utility programs can be executed from a "Tools Menu"--the example program supplied has many useful utilities including one to sum values in a given field throughout a file and those to globally delete, insert, or replace strings of text in any field of every record. Documentation is excellent and a tutorial on database use.

A fraction of a star was deducted because all ARCHIVIST MP fields are string fields, making it more difficult to compute and insert the value of interactive mathematical values than it is using QL ARCHIVE, and because data is not directly transferable to external programs as it is using FLASHBACK.

Requiring a minimum of 256K total RAM, ARCHIVIST MP is supplied on Microdrive cartridges and 3.5" or 5.25" disks. Available for about \$76 (\$56 if you return the original ARCHIVIST 128 cartridge), using UK checks, Eurocheque, International GIRO, or VISA card, directly from ARK Distribution, Corva Farmhouse, Chale Green, Ventnor, PO38 2LA, U.K. (Telephone 0983 79 496). ARK will also supply QL ARCHIVE v. 2.38, for about \$36, and other software.

#### Software87's Text<sup>87</sup> v. 1.06 \* \* \* 1/2

Digital Precision's excellent text editor THE EDITOR was subtitled "Chuck Quill Out!" by its designers, but even the advanced Special Edition of THE EDITOR failed to oust QL QUILL from its WYSIWYG ("What you see is what you get") supremacy, especially after such great QUILL-enhancers as SPEEDSCREEN, TurboQuill+, and FLASHBACK greatly increased the performance of QL QUILL without decreasing its user-friendliness.

Text<sup>87</sup> promises, repeat, promises to do just that, but it has a little way to go before it will supplant the cheapest and easiest of them all.

Text<sup>87</sup> is billed as a full-featured WYSIWYG word processor designed for easy use by amateurs. The printer driver permits configuration for "any type of printer," but, if yours is not one of the several pre-programmed types, it is not directly configurable without an assembler.

Text<sup>87</sup> is menu-extensive and typeface- and typesize intensive: it will print anything that your printer can--assuming compatibility--and offers comprehensive functions, including easy block transfer to other files, QL QUILL's main drawback. It also loads QL QUILL .doc files.

Text<sup>87</sup> is very compact (64K) and requires a minimum of 64K RAM expansion (a total of 192K RAM)--more is better. With 256K RAM, Text<sup>87</sup> is said to load a 3400-word QUILL .doc file in 12 seconds and a 33000-word file in 52 seconds. Printers directly supported in this version include the Epson FX80, LX800, and DX100; the Silver-Reed EXP500; the Brother HR10 and HR15; and the Diablo 630. The FX80 printer driver seems to work well on my old Star Delta 10 printer. An ASCII printer driver is also supplied for use with obsolete or nonstandard printers.

Text<sup>87</sup> is compatible with QRAM, TASK MASTER, SPEEDSCREEN, FLASHBACK, and SPELLBOUND. Founted<sup>87</sup>, by the same firm, is a compatible and easy to use font (or fount) editor; Founttext88 is a graphic printer driver for Text<sup>87</sup> that provides more than 20 printer typefaces in different sizes for Epson-compatible dot-matrix printers. 2488 is a set of dedicated printer drivers for Epson and NEC 24-pin printers that supports different print styles and sizes and proportionally spaced typefaces.

Text<sup>87</sup> lies in complexity somewhere between QL QUILL and The Editor, perhaps closer to the latter. But, if you are ready and able to undertake learning some new word processor concepts, and have a compatible printer, and can afford it, Text<sup>87</sup> should do

about anything very quickly. It may represent a hybrid, rather futuristic combination between a word processor and a desktop publisher.

The documentation I have is in the form of a not always clear or complete 60-page manual; for example, not all commands and options found in the submenus are covered. But a revised manual, including a new tutorial is probably available now.

I had intended to do a full article on the capabilities and operation of Text<sup>87</sup> for this issue, but late notification of a short deadline made this impossible. Next time for sure.

Text<sup>87</sup> is now available directly from Software 87, 33 Savernake Road, London NW3 2JU, U.K. Airmailed prices for Text<sup>87</sup> and Founted<sup>87</sup> are \$75 and \$15, respectively. Founttext<sup>88</sup> and 2488 are \$45 and \$15, respectively. Payment must be made by traveler's check, International GIRO postal money order, or other check directly payable at a U.K. bank; add about \$8.50 for checks not so payable!

#### EMSOFT'S MAILBAG \* \* \* 1/4

MAILBAG is American software consisting of database handling programs and screens for use with QL ARCHIVE, a minimum of 256K RAM is required. It provides a versatile database for purposes ranging from a simple address to small-business use. Its designer Peter Hale of Boston is high on it, saying that it is "the most exciting program for ARCHIVE that has yet been released," distinguished from other database applications for the QL by its great flexibility in handling names and addresses, its lack of protection from illegal pirating, and in offering menu-driven QL ARCHIVE programs. It also offers mailmerge facilities using specially prepared QL QUILL documents.

Documentation consists of a 4-page flyer and a 12-page .doc file, but I understand that you may never have to use the latter. I did!

Peter claims that MAILBAG is unique in four respects:

- It prints labels to a U.S. Postal Service standard
- It is unprotected and may be fully user edited for screen displays, programs, and listings
- It prints with versatility without having to change printer .dat files.
- The user may design custom formats for record display on printouts or as mailmerge documents.

I didn't have a lot of time to really "wring it out" and I am not a database person, but from what I have seen it is a winner. I shaved part of a star because it should be on runtime ARCHIVE and stand alone--maybe in its next version.

Excellent work Peter!

MAILBAG is available directly from EMSOFT, Box 8763, Boston, Mass. 02114-8763 for \$19.95 on 5 1/4" 80-track floppy disk or \$21.95 on Microdrive cartridge. No credit cards. Dealer prices are available.

NEXT TIME: A complete and thorough treatise on Text<sup>87</sup> and more hot software.

# Z COLUMN

by Tim Woods

There is a lot to report on this issue, as Z88 activity keeps moving along. But first, an explanation is in order, for those joining us for the first time. The "Z-COLUMN" is a regular feature that discusses the newest member of the Sinclair computer family...the Z88 Laptop. While maintaining some of the characteristics of earlier Sinclair machines (Z80 CPU, very light-weight/compact design, use of function keys or combination of keys to execute major commands, etc.), the Z88 achieves a whole new standard of performance and power. If you haven't seen one or tried one out yet, there just might be a computer dealer in your area.

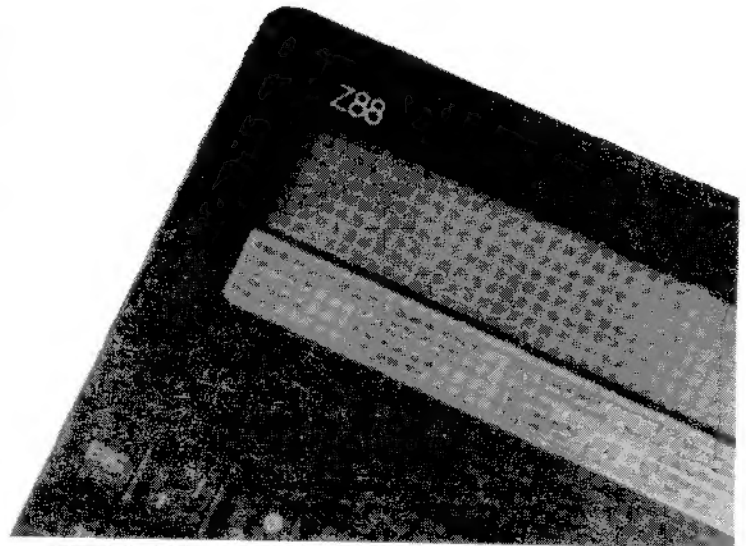
As of this writing, there are three organizations involved in marketing the Z88 in the U.S.A. First, there is SSI Computer Systems in Portland, Maine, who distributes the Z88 inventory from their New England warehouse. SSI is being advised by The Marketing Clinic, which is run by long time Sinclair associate, Nigel Searle, who is also the former head of Sinclair Research, U.S. division. And finally, there is another organization near Chicago, Illinois, called Cambridge Direct Ltd., operated by President, Kevin Jeffers. Cambridge Direct is the exclusive direct marketing arm for the Z88. To date, I feel that an adequate job is being conducted to promote and market the Z88. There are several hundred dealers around the U.S. that are stocking them. A large ad recently appeared in the WASHINGTON POST newspaper, and very favorable reviews of the machine are in the most current issues of BYTE and COMPUTER SHOPPER.

The first issue of Z88 USER, "the official Z88 computer magazine" hit the streets in April. The 34 page publication is being produced by the publishers of QL WORLD Magazine. It looks like it will be a good magazine as soon as they get rolling along on a regular schedule. A question and answer column covered two items that are undocumented in the Z88 User Guide.

Another publication, which I am personally involved in is called CLUB Z88. It is a non-profit bi-monthly newsletter. One unique feature, is that subscribers can earn points, free gifts, and a chance to sit on the exclusive "board of directors" by contributing articles, tips, and programs to the newsletter. You can obtain a sample issue, by sending a SASE to: CLUB Z88, c/o Time Designs, 29722 Hult Rd., Colton, OR 97017.

New products are just now coming on the market: a spelling checker, the official Cambridge 300/1200 "matchbook" modem, A "C" Compiler, the Advanced User Guide, a cassette tape interface to provide security back up for the RAM cards, and the elusive one meg RAM cards are still being promised before the year's end.

As a tip for PIPEDREAM (the on-board word processor): I have found that following the guidelines specified for moving the cursor position around, using TAB, arrow keys, diamond key, etc., that getting into the habit of using these will develop faster manipulation of your text. I know this sounds like common sense, but more often than not, we use old typing habits in word processors that can really slow things down.



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# The Classified

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WANTED: Booklet on 2050 Modem and any relevant software. Also full-sized keyboard. N. Oshana, 187 Morningside Dr. E., Bristol, CT 06010.

WANTED: ZEBRA GRAPHICS TABLET, w/manual, working or defective (if repairable). New or used wafers for A&J Microdrives. Send description & price to: W.E. Powden Sr., R#1 Box 364, Bridgeport, IL 62417.

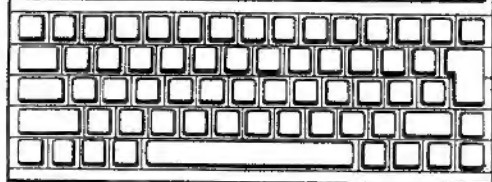
FORTH 79.83 USERS, I would like you to drop me a line to swap information and help. George David Johnson, Beaufort Naval Hospital, PO Box 6204-A, Beaufort, SC 29902.

BOOK WANTED: "S.U.M.-Small User's Math- Powerful Algorithms". Willing to pay any reasonable price. Jaime A Cruz-Figueroa, Rt 2 Box 245-M, Lillington, NC 27546.

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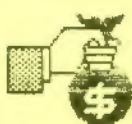
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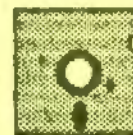


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THE DESKTOP PUBLISHER  
by Lenke Software



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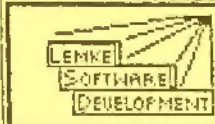
- 1) WYSIWYG (What You See Is What You Get!)  
Create your text on the screen... as easy as typing! LOAD graphics... Load ICONs... Import TASWORD text via the TASWORD conversion utility.
- 2) AUTOMATIC and MANUAL line and character adjustments.
- 3) RESTORE FONT (after using the BOLD/MODERN/ITALIC modifiers.
- 4) KEEP/UNDO/SAVE/LOAD/LOAD ICON LOAD SCREEN\$/SAVE SCREEN\$/ WIDE/HIGH/CLS/SCROLL SPEED
- 5) OVER/INVERSE/CAPS LOCK UP TO 16 POINT FONTS (font package in development)
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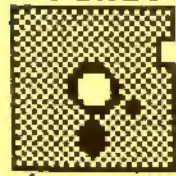
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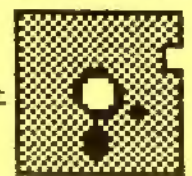


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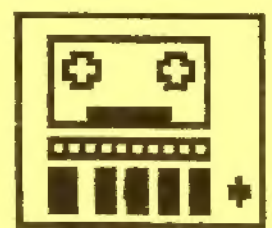
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